OFFICIAL PROCEEDINGS
RAILWAY CLUB OF PITTSBURGH
$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. NOV. 23, 1933. No. 1.

TODAY IN WASHINGTON

By the HON. DAVID A. REED,
Senior United States Senator from Pennsylvania, Washington, D. C.

1728

OFFICIAL PROCEEDINGS

OF

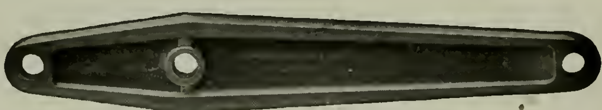
The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII No. 1. | Pittsburgh, Pa., Nov. 23, 1933 | $1.00 Per Year 25c Per Copy



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OFFICIAL PROCEEDINGS
OF
The Railway Club of Pittsburgh
Organized October 18, 1901

Vol. XXXIII No. 1. — Pittsburgh, Pa., Nov. 23, 1933 — $1.00 Per Year, 25c Per Copy

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PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
†A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933

†—Resigned.
*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
NOVEMBER 23, 1933

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock, P. M., with President C. O. Dambach in the chair.

Attendance 332, names had not been entered on eleven of the registration cards collected at door.

MEMBERS

Adams, W. A.
Allderdice, Norman
Allen, Harvey
Ambrose, W. F.
Ament, F. C.
Babcock, F. H.
Bailey, J. C.
Bancroft, A. G.
Barr, H. C.
Beam, E. J.
Beaver, R. C.
Berg, Karl
Best, D. A.
Blair, John R.
Blest, M. C.
Bone, H. L.
Bonhoff, E. L.
Britt, T. E.
Brown, E. L.
Buffington, W. P.
Burnette, G. H.
Campbell, J. E.
Cannon, T. E.
Carlson, Frank R.
Carlson, L. E.
Carruthers, G. R.
Chaffin, H. B.
Chilcoat, H. E.
Christy, F. X.
Church, S. L.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Cotter, G. L.
Coulter, A. F.
Courtney, H.
Crawford, D. F.
Crenner, J. A.
Cruikshank, J. C.
Cunningham, R. I.
Dambach, C. O.
Davies, James
Davis, Charles S.
Dempsey, P. W.
Dickinson, T. R.
Diven, J. B.
Downes, D. F.
Durkin, J. E.
Edwards, C. H.
Ekey, J. S.
Emery, E.
Emsheimer, Louis
En Dean, J. F.
Endsley, Prof. Louis E.
Ernest, E. E.
Farrell, George R.
Farrington, Robert J.
Fay, Hon. Frank L.
Fenton, H. H.
Ferguson, J. H.
Finegan, L.
Flinn, R. H.
Forsberg, R. P.
Frauenheim, A. M.
Frauenheim, P. H.
Freshwater, F. H.
Fry, L. H.
Fults, J. H.
Furch, G. J.
Gaffney, Thomas H.
Gilg, Henry F.
Glaser, J. P.
Glenn, J. H.
Goda, P. H.
Gray, Guy M.
Grieve, Robert E.
Guinnip, M. S.
Haller, C. T.

Haller, Nelson M.
Hancock, M. L.
Hansen, William C.
Harman, H. H.
Hauser, G. B.
Hepburn, P. W.
Herbert, T. C.
Herrold, A. E.
Hervey, R. S.
Hilstrom, A. V.
Hohn, George W.
Holiday, Harry
Honsberger, G. W.
Hoover, J. W.
Horner, William
Huff, A. B.
Hughes, I. Lamont
Hursh, S. R.
Hykes, W. H.
Irwin, R. D.
Kentlein, John
Kirk, W. B.
Kraus, Raymond E.
Kromer, William F.
Kroske, J. F.
Kummer, J. H.
Lanahan, Frank J.
Lanahan, J. S.
Landis, William C.
Layng, F. R.
Lee, L. A.
Leet, C. S.
Logan, J. W., Jr.
Longdon, Clyde V.
Lundeen, Carl J.
Lynn, Samuel
Maliphant, C. W.
Mannion, M. F.
Mason, S. O.
Matthews, R. J.
Mayer, L. I.
Miller, John
Mills, C. C.
Misner, George W.
Mitchell, W. S.
Montague, C. F.
Montgomery, J. L.
Morgan, A. L.
Morgan, Homer C.
Mulvey, J. I.
Mussey, D. S.
Myers, Arnold
Myers, W. H.
McAbee, W. S.
McAndrew, R. E.
McFetridge, W. S.
McGeary, E. J.
McGeorge, D. W.
McHugh, C. A.
McKinley, John F.
McNamee, W.
Nagel, James
Nieman, Charles J.
Ogden, F. A., Jr.
Orbin, Joseph N.
Paisley, F. R.
Palmer, E. A.
Pringle, H. C.
Pringle, Paul V.
Purchard, Paul
Rankin, B. B.
Rauschart, E. A.
Redding, P. E.
Renshaw, W. B.
Richardson, E. F.
Rizzo, C. M.
Robinson, R. L.
Rossell, R. T.
Rudd, W. B.
Rutter, H. E.
Ryan, Frank J.
Schadt, A. D.
Schaffer, W. E.
Schaller, Andrew J.
Searles, E. J.
Sekera, C. J.
Severn, A. B.
Sheets, H. E.
Sheridan, Thomas F.
Simons, Philip
Sixsmith, G. M.
Smith, H. K.
Smith, J. Frank
Snyder, F. I.
Snyder, J. C.
Stamm, Bruce B.
Stark, F. H.
Stein, J. A.
Sterling, C. C.
Stoffregen, L. E.
Stucki, A.
Sullivan, P. W.

Swope, B. M.
Sykes, A. H.
Thomas, George P.
Thomas, Theodore
Tipton, G. M.
Trax, L. R.
Triem, W. R.
Trust, C. W.
Tucker, J. L.
Tuttle, C. L.
Unger, Dr. J. S.
Urtel, E. J.
Van Blarcom, W. C.
Vollmer, Karl L.
Walther, G. C.
Warfel, J. A.
Weaver, W. Frank
Webster, H. D.
West, Troy
Wikander, O. R.
Wildin, G. W.
Winslow, S. H.
Winter, Paul S.
Withrow, R. C.
Woodward, R.
Wright, C. W.
Wright, Edward W.
Wright, John B.
Wyke, J. W.
Wynne, F. E.
Yarnall, Jesse

VISITORS

Allderdice, Lawrence
Allderdice, Taylor
Baker, George N.
Beard, C. W.
Bergman, O.
Bogart, Frank L.
Bown, C. Elmer
Brand, Leslie
Brown, R. J.
Bryant, L. J.
Bunnell, C. G.
Burke, J. V.
Burnett, L. H.
Campbell, W. T.
Casley, W. C.
Cavanaugh, T. J.
Champlain, C. H.
Coons, F. A.
Cornell, J. R.
Cree, W. M.
Davidson, R. B.
Davis, C. B.
Davis, William B.
Duff, R. G.
Duff, S. B.
Dudley, H. M.
Dunham, C. W.
Eisenman, W. H.
Felton, Frank
Follett, W. F.
Gangloff, F. C.
Gardner, K. C.
George, W. J.
Harriman, Henry A.
Farrington, Arthur R.
Hawkins, P. R.
Haynes, J. E.
Heard, John J.
Herbst, F. A.
Hicks, L. W.
Higgins, W. E.
Holmes, David
Howat, C. W.
Johnson, W. M.
Kelly, J. B.
Kohl, J. C.
Lamberger, E. H.
Laughner, W. E.
Lawler, T. L.
Lear, E. W.
Leech, B. E.
Leonard, Ross C.
Lepper, C. W.
Leschke, C. W.
Lewis, S. B.
Maloney, J.
Mason, Robert
Maurer, E. L.
Menaglia, V. A.
Miles, R. E., Jr.
Mitchell, H. E.
Moles, Frank B.
McClintock, Charles L.
McCormick, E. S.

McCormick, James A.
McHugh, E. C.
Naylor, Douglas
Neal, Reese R.
Olsson, F. J.
Pickels, H. D.
Ramsey, Paul
Ranck, J. F.
Reed, Hon. David A.
Reed, M. R.
Robitzek, A. R.
Ross, B. J.
Routh, Edward W.
Ruch, Paul R.
Saltz, Clare F.
Sheparson, O. C.
Smith, M. A.
Smith, Robert B.
Smith, Sion B.
Spalding, L.
Stacy, R. G.
Stanford, Tex
Stanton, Charles B.
Stevens, R. R.
Steinmetz, A. C.
Teall, Maynard
Teeple, Berkley
Tucker, John H.
Van Buskirk, Arthur B.
Vandivort, R. E.
Ward, C. F.
Wareham, J. K.
Warner, R. H.
Wibnur, A. J.
Williams, D. G.
Williams, K. S.
Wilson, W. S.
Wolf, Joseph
Wolfe, W. B.
Wood, W. E.
Woodruff, H. H.
Woods, G. M.
Woods, Walton
Woozley, D. E.
Wright, Robert M.

PRESIDENT: We will dispense with the call of the roll as we have a complete record of the attendance in the registration cards.

With your consent we will dispense with the reading of the minutes of the last meeting, as they are in print and will be distributed to you in a short time.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Baker, George N., Chief Clerk to Vice-President and General Manager, Bessemer & Lake Erie Railroad Co., P. O. Box 456, Pittsburgh, Pa. Recommended by F. I. Snyder.

Boyd, J. W., Superintendent, Monongahela Railway Company, Brownsville, Pa. Recommended by G. H. Burnette.

Bramwell, R. W., Traffic Manager, P. & W. Va. Ry. Co., Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Eisenman, William H., Day Agent, Pullman Company, 7423 Race Street, Pittsburgh, Pa. Recommended by W. Frank Weaver.

Megee, Caleb R., District Manager, Car Service Division, American Railway Association, 2235 Koppers Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Mohn, Louis, District Manager, Garlock Packing Company, 339 Boulevard of Allies, Pittsburgh, Pa. Recommended by Lloyd Sutherland.

Reed, M. R., General Superintendent Motor Power, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Rieger, N. H., Diesel Electric Locomotive Sales Department, Westinghouse Electric & Manufacturing Co., 1319 Singer Place, Wilkinsburg, Pa. Recommended by G. W. Honsberger.

Taplin, Frank E., Chairman of the Board, P. & W. Va. Ry. Co., Union Trust Building, Cleveland, Ohio. Recommended by C. O. Dambach.

Wentworth, A. S., Traction Manager, Westinghouse Electric & Manufacturing Co., 824 E. Hutchinson Street, Edgewood, Swissvale P. O., Pa. Recommended by G. W. Honsberger.

Westerman, F. R., Assistant Treasurer, P. & W. Va. Ry. Co., Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Woods, G. M., Railway Engineer, Westinghouse Electric & Manufacturing Co., 206 Woodside Road, R. F. D. Wilkinsburg, Pa. Recommended by H. K. Smith.

PRESIDENT: In accordance with our By-laws these proposals will be referred to the Executive Committee and upon approval by that Committee the gentlemen will become members without further action by the Club.

Are there any announcements?

SECRETARY: Since our last meeting we have received information of the death of one of our members, J. T. Campbell, Agent, B. & O. R. R. Co., Pittsburgh, Pa., died November 12, 1933.

PRESIDENT: A great many of our members, especially the older ones, will remember Mr. Campbell. An appropriate memorial minute will appear in the next issue of the Proceedings.

If there is no further business to come before the Club at this time, we come to the topic of the evening. I note we have with us a gentleman who has been a member of this Club for quite a long time but, due to his retiring disposition, he seldom gets on his feet to enter into the discussions. However, due to his long association with our honor guest I am going to draft him tonight to introduce the speaker of the evening. I refer to Mr. R. T. Rossell, President of the Bessemer and Lake Erie Railroad.

MR. R. T. ROSSELL: There is only one feature of this job that I am sure of and that is that you do not want to hear very much from me, so I will make it short.

Your guest speaker tonight is an old time railroader, not an old railroader but an old time railroader. He spent many years of service in the railroad business. He is a member of a family identified for many years with both the construction and operation of railroads in this territory. At a very early age he made an unofficial entrance into the railroading business. As many of you know, he spent some years down at Princeton and it is a matter of tradition that many of the nights he should have been busy with his text books he was down in the tower at Princeton Junction, acting as the unpaid assistant to the regular operator, thereby placing in jeopardy all the heavy traffic between Jersey City and Trenton.

Of course in those days, he was strictly an amateur, but later on he joined the professional ranks and became a railroad lawyer, in which connection he also achieved a brilliant record. I have in mind one case in which he convinced a court that when a slip starts in a railroad cut it is just as likely to slide up hill as down. About the same time he became a railroad director and he made an ideal director because he always insisted upon exercising independent judgment and never paid any attention to any recommendation made by the management. Finally he fell upon evil days and into evil ways and became a statesman, and he is now engaged in a gallant struggle to restore to the American people some of their lost faith in a representative form of government.

I haven't the slightest inkling of what he is going to say tonight but I know him to be a man of utter courage and absolute integrity, and what he does say to you I am sure will be the truth, the whole truth and nothing but the truth.

Gentlemen, it is both a pleasure and an honor to present to you the Honorable David A. Reed, Senior United States Senator from Pennsylvania.

TODAY IN WASHINGTON

By the HON. DAVID A. REED,

Senior United States Senator from Pennsylvania, Washington, D. C.

Mr. Rossell and my friends: I do not deserve so gracious an introduction as Mr. Rossell in his kindness has just given me. I am not a railroad man and I am sure the conductor of that newspaper train that runs out of New York about three o'clock in the morning, which was stopped cold at that section tower at Princeton Junction, will testify that I am not a railroad man. He came up into the tower ready to fight, and I don't know yet why he didn't.

The topic that has been given me for tonight is "Today in Washington." And it may be of some interest if one who has been in the thick of it for some time should give you quite candidly what seems to him to be going on in and about Washington. I am aware that there are newspaper men present and I shudder to think what my remarks will look like when I see them in print tomorrow morning, but nevertheless I am going to try to tell you as honestly and as fairly as I can what seems to be going on there at the present moment. I am well aware that this is not the time to say with Coué that all is for the best, that this is the best possible world and that every day in every way we are getting better and better. Even if I did say it, though it might be popular, it would not be true. There are many things that should encourage our optimism, but there are some things that ought to be frankly stated if one is going to paint a true picture of what is going on.

At the center of it all is our new President, a man of great courage, of the utmost charm of manner and speech, a man for whom one can not restrain an admiration because of the fortitude with which he has overcome almost insuperable personal obstacles, and for the courage with which he is carrying on with those policies to which he has committed the land. Personally I have a high admiration and liking for him, and I beg of you not to interpret anything that I may have to say as meaning anything to the contrary of that.

He was elected on a platform that all of us felt was rather conservative, a platform that gave scant indication of any of these policies that are now to the front. I do not wish to make a partisan talk in any sense. I am only speaking the thought that is in the minds of many Democrats in and around Washington as well as many old-fashioned Republicans like myself.

As I say, we have at the core of it all this admirable gentleman for whom we have so much admiration. He has called to assist him a great many people of whom I for one never heard before and of whom I venture to think you never heard before. Chief among them I should say was Professor Moley, but he has pretty well disappeared from the picture and I do not need to mention him further.

He has as assistant, in a most ambitious effort, General Johnson, a man of considerable business experience, President of the Moline Plow Company and engaged in other important occupations, a man of great personal force, great aggressiveness and very firm will. I was quite taken with him in the two or three weeks association we had when the new Recovery Act was before Congress. He seemed to know what he wanted and had a firm idea of how to get it.

Mr. Roosevelt has been lucky also in securing Mr. Lewis Douglass as Director of the Budget, a man of great strength of character and fine intelligent understanding of the problems confronting the government. He is one of the best men now in Washington, I think.

He has also with him as his Secretary of Agriculture Mr. Henry Wallace, charged with duties more important than any Secretary of Agriculture ever had before. And he is a man of personal charm and fearlessness and enterprise.

Then in addition to them he has a number of professors, who come on to the stage with sometimes bewildering rapidity, and among the most important of these is, I think, Professor Warren, an agricultural economist from Cornell, who has been advising the President on fiscal and currency problems. He is typical of that group and it is not necessary to recite the list of the others.

The administration started last March with a brave effort at economy of government, introducing a bill which called for very drastic reductions in the cost of government and it passed with pretty general approval of the entire country. It carried with it a lot of cuts in pensions of veterans of which most of the country was not conscious at the time. But it is fair to say that 95% of the population approved of the effort that was then made to reduce the ordinary cost of government. Then followed some very necessary measures regarding the banks, which the country as a whole approved in giving the President full support in what was being done. Then came in a series of measures not at all suggested in the platform of either party, not mentioned in the campaign addresses of any candidate, forced through Congress by the overwhelming authority that the administration carried, that collectively constitute today what we know as the "New Deal". It is on this that I particularly want to speak tonight, not by way of condemnation but by way of description, to help you form your own opinion upon their merits or demerits. I actually believe that nineteen out of every twenty mature Americans have no conception of the items that go to make up this "New Deal". I believe a large part of the present undoubted popularity of the administration is based upon personal admiration of the individuals in it and not from any understanding of what is actually being done at Washington.

Let us take them up more in detail. First came a bill for the repudiation of the government's promise to pay its bonds in gold coin of the standard prevailing at the time they were issued. Early in May this government issued half a billion of bonds which contained the promise to pay in gold "of the present standard of fineness." One month later was passed this Act declaring that that promise was null and void and contrary to public policy wherever it appeared, either in government bond, municipal or state bond, or private corporation bond. The bonds of your railroads were affected by that statute just as much as the United States bond. And among the difficulties under which the railroads and other corporations labor at this moment is the fact that it is beyond their power to promise to repay a loan in the medium in which they obtained that loan. It is made against public policy and beyond our power to agree to repay to a lender that which we borrow from him. He is confronted and we are confronted with the dilemma that however good may be the currency he advances to us, it is beyond our power to agree to repay in that standard or its equivalent.

Then came shortly afterward the bill known as the Securities Bill, based on the theory that there is some kind of Interstate Commerce that takes place when a bond or share of stock is sold by a citizen of one state to a citizen of another state or when negotiations for its sale take place across a state line. That is the legal theory. Practically however the Securities law is directed toward a prevention of those offenses that had characterized the issue of some securities in the past, with inadequate description or misleading description. There is a determination that that should not happen again. And it is like curing a cold in the nose by cutting off the patient's head. It has completely stopped the issuing of any kind of securities anywhere in the United States except a very few which contrive to limit their issue and sale within state lines. I saw just a few days ago stock of a distillery offered as a speculation, with no description whatever, and it said "Subscriptions will be received in Baltimore but only from residents of the state of Maryland." The great industrial concerns of the country can not do their refinancing or any financing at all subject to such a system as that. The Bill provides that every director of the issuing concern shall be individually liable for an indefinite time in the future to any holder of any security if the holder can prove to the satisfaction of the court that some material statement of fact has been omitted from the description of the security made at the time the security was originally issued. In other words if I buy a Carnegie Steel Company bond today and the company advertises that security in the paper, and ten years from now, if the bond has gone down to ten per cent of its cost, if I can prove that something that then seems to me to be material was omitted from that newspaper advertisement, every director of the Carnegie Steel Company is individually liable to me for all the loss I have suffered from its depreciation in value. It needs no further description than that to convince you of the fact that the effect of that law has been to completely stop the financing for all of the industries of the country. It may be wise or unwise, but that is the result.

That was followed, almost before we had had time to read it, with the Agricultural Adjustment Act, based upon the theory that we of the cities do not pay a sufficient amount to the producers of the cereals and textiles of the country and that the farmer who produces these things must some how receive more than the market price for his commodity if he is to have a fair share of the prosperity of the nation. The device by which that equalization of profit was worked out, was by what is known as a processing tax, levied upon the first processor of the commodity at the time he uses it. That is to say the miller who grinds the wheat pays a processing tax on the wheat, and the tax is supposed to be paid over by the United States Government to the man who grew the wheat. Or when cotton is ginned the ginner of the cotton pays the tax to the government and the government pays it over to the grower of the cotton. Some half dozen commodities were listed to be subject to this process, but the Secretary of Agriculture was given the discretion to pick out any other commodities that might compete with these, for example, rayon as competing with cotton, oats as competing with wheat, etc. It gave him complete discretion to add to the list of commodities, and Congress, which has the taxing power and has been very jealous of that power and has never before delegated it, now says in that law that not only may the Secretary of Agriculture pick out those commodities which are to be taxed, but that he may prescribe the amount of the tax in his discretion, to be put on at such a time and taken off at such a time, to be raised or lowered at such a time as he in his sole discretion shall think best. The same Congress that year after year has rejected a simple manufacturers' sales tax of 1¾% puts on a tax of indefinite extent and vests the power to levy it in a cabinet officer uncontrolled by any other person on earth. You can see how far we have gone from the system of government ordained by our grandfathers, who guarded the right of taxation with representation, by providing that every tax bill must originate in the House of Representatives, the popular House. They remembered King George's tax on tea. This bill now gives the Secretary of Agriculture, who may be appointed during recess, without confirmation by the Senate, the unlimited power to tax any product, at any rate, at any time, for as long as he may please. It goes without saying that some of us were vocal in our dissent when that went through. That was however the next step.

Then came the Act which is known generally now as the N.R.A. based on the most commendable of motives, a desire to get people back to work, a desire to eliminate unfairness of competition, a desire to get rid of child labor, a desire to get rid of sweat shops, all fully and completely commendable purposes. But the working of the Act is, to say the least, not so good. It provides to begin with that a new kind of law might be made for each industry, pretty much in the way the old guilds used to legislate for their own trade in the Middle Ages. So now the majority of any industry might get together and agree upon a plan which is known as a code of fair competition, and what it is to contain is left pretty much to the imagination. But it must contain a clause requiring them to be fair to labor. When a majority of an industry has agreed upon such a code and the President has approved it, it has an effect generally upon all the other members of the industry to such an extent that violation by one who had not signed it is a criminal offense under the laws of the United States. Thinking that did not go far enough, General Johnson, who was in constant attendance at our legislative committee meetings, said the real teeth of the bill were in the sections which followed and which were essential to the working out of what I have just explained. They provided that if in any trade a serious fraction of those in the industry proved recalcitrant the President might impose a license system and require the issuing of licenses by himself as a prerequisite to the right of any citizen to carry on his own business, and any one who ventured to engage further in his own business without such a license should be guilty of a federal crime afresh each day he continued to carry on his own business. Some of us claimed that that was un-American to require any one's consent to the carrying on of one's lawful business.

That comprises pretty much what was done by Congress. But after adjournment further steps continued to be taken. For one, on the recommendation of Professor Warren, and without consultation with either the Treasury or the Federal Reserve officials, the nation launched out into a system of purchasing gold, first in this country and next in the world markets, on the theory that if we buy gold, and enhance the market value of gold in terms of dollars, the result would be a rise in the price of all commodities and that commodities would be restored to a higher level than that occupied when the process began. And the object was to regain that scale of prices which had prevailed in 1926. Why that year should be selected has not been explained to me. As I look over the curve of commodity prices for the last century, almost never have prices been as high as they were in 1926. It was a period of unequalled commodity prices. But be that as it may, that was the declared object of this policy of buying gold. The Treasury and the Federal Reserve, and I include Democratic members of the Federal Reserve, all urged that the buying of gold would have nothing whatever to do with commodity prices, since the currency is off gold. But Professor Warren insists that is not true. And we launched into a policy of gold purchasing, and I think the position of the Federal Reserve Board is being borne out by what we see from day to day in the markets. The price of various commodities has not been moved by any means as the result of this gold buying policy.

It all leads however to an apprehension of the use of the powers that were given to the President by an amendment to the Agricultural Adjustment Act. Of all the strange places to put it that is the strangest. While this farm relief bill was pending, Senator Thomas of Oklahoma introduced an amendment affecting the currency, giving the President power to issue four different kinds of inflated money: sell government bonds to the Federal Reserve Board for its notes up to $3,000,000,000; issue greenbacks to the amount of $3,000,000,000 to buy in bonds from the market; cut the gold content of the dollar down to 50% of its former value; and lastly to coin silver freely at any ratio and in any amount. Every kind of inflation money that this world has ever seen, excepting possibly sea shells, was contained in that Thomas amendment. And the apprehension on the part of the Reserve Board and most of the bankers of the United States is that if this Warren scheme proves a failure, the President may be required by force of circumstances to resort to one of the methods of inflation outlined in the Thomas amendment.

The pressure for inflation from the middle west is very great indeed. Some of our friends seem to feel that it is the cure for all our troubles. Undoubtedly the man who has a lot of commodities and debts will profit like any other speculator in the appreciation of his commodities and the easier payment of his debts. But any one who has read history, the history of past inflations, knows that Grover Cleveland told the truth in 1892 when he said that the most cruel sufferer from inflation is the man who works with his hands. And Daniel Webster said the truth a century ago when he said the best known device for inflicting brutal punishment upon the humbler part of the population is the debasement of the currency.

We have only to consider the experience of Germany where the farmer brought his produce to market and found that the amount he had received had depreciated during his return trip to his farm so that what he had left was less than the cost of raising the produce. We have only to consider the experience of the pensioner in Germany, those widows living on a fixed income from the government. I was talking at a meeting the other day and some one gave me a 10,000 mark German bill, worth at face $2,400. One hundred of those made a million marks, worth $240,000 in 1920. By September, 1924, it took a million times a million marks to buy an orange, and it would have required a pile of those bills, originally worth $2,400 each, seven miles high to buy that orange. Think what that did to every person in Germany who had a little savings account or an insurance policy or who was living on a fixed income from any source or worked for money wages, because the lag between the inflation and the collection of wages was always at least a week, and many a time in Germany in those days money went to a tenth its value in seven days. The principal sufferer from that was the German workman and the thrifty little fellows. It was not the banker or the speculator, it was the little man who had trusted in his nation's honor. It is the cost of these things that makes us shiver when we hear talk coming from the Middle West as to the panacea there is in inflating the currency. Read the description by former Ambassador White of the money inflation that characterized the French Revolution. He was induced in 1876 to re-publish this same little essay that he had written in 1860. The picture he paints of the abject misery of the people of France, in that decade from 1790 to 1800, is enough to cure anybody of the idea that relief comes from tinkering with the currency of the nation. That was the reason that kept Napoleon firm in his resolve that France never again should debase her currency or issue unsecured bills. It was that that let them go through the terrible campaigns that led up to the disaster of Waterloo and the disasters of the war of 1870 with Germany without any banking crisis or any money or treasury collapse. If we could only learn the lesson they learned at that time, America of the next decade would be much better than otherwise it would be. I do not know that I need to enlarge any more on that. Most of you know quite as much as I do about it, and I hope you agree with me.

Since Congress adjourned also the country has seen fit to recognize the government of Soviet Russia. I am reminded of what Carter Glass said, that he was not in the least surprised that we should recognize Soviet Russia but he was extremely surprised that Soviet Russia was willing to recognize us. Recognition of another government is wholly a function of the executive. It requires no assent from the legislative branch of the government. The President is fully within his rights in recognizing Russia and it may well be that it is the part of wisdom to recognize Russia at this time. I would not presume to criticise until I see what follows. It is hoped that it will tend to increase foreign trade, although the trouble with American trade with Russia has not been the absence of recognition.

Three years ago we were doing a bigger trade with Russia than any other country on the globe. I do not believe recognition will have as much effect as is hoped for on Russian trade, because the trouble really comes from the fact that she is having great difficulty in meeting her short term obligations, and as a credit risk she is not so good. Italy, Japan and Germany can testify whether Russia is a good risk, in that on several hundred short term credits a compulsory extension has been found to be necessary and in each case Russia has found it impossible to get any more credit in these three countries. I am very hopeful that any credits we may extend to Russia should be guarded with a sufficient amount of security, as far as it is possible to be secured. It seems to me that her financial difficulties at the present time are almost insoluble. If any of you think of making any investment in that part of the world you should do it with great caution.

Now to review the whole matter of these different steps of the "New Deal", I have tried not to talk in a partisan way or to make a political speech. I have tried to be perfectly frank. It seems to me that the question is after all a great deal bigger than the soundness or unsoundness of any one of these particular steps I have outlined. It seems to me there was never a time since this country fought for its freedom, there was never a time since the Bill of Rights was embodied in the Constitution, when the liberties of the individual in America have been held so lightly by the mass of the citizens. People just don't care whether those liberties which seemed so dear to the forefathers are being taken away today. People just don't care that the liberty of the press is denied by the Treasury Department and that we are not permitted to know the truth about the fiscal affairs of our country's government. Some of the newspapers protested but most of us did not seem to be aroused. We were more interested in knowing whether Pitt was going to win the football game. Those liberties America has as the result of hard fighting on the part of our ancestors, yet we sit supine when they are being taken from us.

But we are told this is a regime of experimentation. How do we know whether it is a sound or unsound experiment when we are not permitted to know the facts. The government is buying bonds in an effort to maintain the government bond market and we are told we are not allowed to know how much they are buying. You may look at the newspaper quotations, but you are not permitted to know how much is artificial and how much is not. We are told the dollar is to be lowered step by step, but nobody knows how far it is to be lowered. Are we little children that we may not be told what is being done to us, how far the dollar is to go, where the process is to stop? I do not believe the people who drafted the Constitution would sit quiet under such beaurocracy as that. All that is being done is done from high motives. The worst things that come to us are usually done with high motives. The good intentions that pave the streets in hell are good intentions just the same. In all sober seriousness it is time to think whether the liberties our fathers fought for are or are not to be taken away from us.

I am not a pessimist. For over a year there has been a marked improvement in the commerce and industry of the world as a whole. We have not seen it because we are too close to it. The improvement in Western Europe has been very marked. The improvement in Great Britain is far greater than anything we have seen. I believe no government was strong enough to keep us from going into the slump as we did in the last three or four years, for the whole world had set its face that way. No government could have prevented America from falling into the depression that invaded the entire world. And similarly no government can keep us from sharing in the world improvement. That is why I am an optimist. I do not believe the common sense of America is all gone. We have the intelligence to insist that we have our share of the improvement. I do not ask much of the administration, whether it be Republican or Democratic. All I ask is that we have our full share of the improvement that is so marked already in other quarters of the world. It is easy to call people Tories. I am perfectly willing to admit that this world moves and we have got to move with it. At the same time I do not believe that all the wisdom of our Ancestors is to be discarded merely because we went into a tailspin in 1929. I do not believe all the lessons of experience are false lessons and that we can have a clean sweep and brush away all the wisdom learned by our forefathers and start in making our own rules, without heading for disaster. I do not believe that this generation can scrap all the instruments of safe guidance that were invented before our time and set out across the boundless seas with no compass except a wish bone. I thank you very much.

PRESIDENT: I think we all know a lot more about what is going on in Washington than we did when we entered this room. The Senator has given us so much to think about that I fear we will have to read the Proceedings before we can intelligently enter into any discussion of the subject.

I notice we have with us tonight some distinguished guests. I see an old friend, Hon. Frank L. Fay. May we have a word from him?

HON. FRANK L. FAY: Mr. President and Gentlemen: The only thing I can say is that I am very glad to be here tonight. You know I was in active business here for eight years and I am glad to get back again. After ten years or more of absence from the meetings it is nice to be back again and get into association with those who are responsible for carrying on this Club. It is a very great pleasure indeed to be here and to have heard the splendid address.

PRESIDENT: I see Mr. I. Lamont Hughes. Have you a word, Mr. Hughes?

MR. I. LAMONT HUGHES: Mr. Chairman and Gentlemen: I do not think I have anything to say after listening to this wonderful speech. I am not a speechmaker. I am glad to be here. I thank you.

PRESIDENT: Mr. Snyder, one of our Past Presidents who comes around after he has retired from office. I wonder if he would say a word?

MR. F. I. SNYDER: I thought I had retired at the last meeting. The subject is a very interesting one but I do not know enough about it to care to attempt to discuss it publicly. I ask you to excuse me.

PRESIDENT: We have one of our old timers here tonight, President I do not know how many years ago and one whom we always like to hear, Mr. Frank Stark.

MR. FRANK H. STARK: Mr. President: I hesitate to attempt to make any remarks, after hearing the very able address. Through the daily press we are prone to form conclusions, but we have a clearer understanding tonight of the details than we have ever had before. I think the Senator has been very fair in his statement of the facts, nothing partisan about it, and I have always admired him as our representative of the State of Pennsylvania in the highest legislative body in Washington. I do not believe we ever had a Senator that received the same recognition in the same limited time that Senator Reed has. I am sure we have all profited by being here. Personally I am glad to come back but I am sorry to miss so many familiar faces. There are still a great many of the men I have associated with in this Club and I appreciate meeting them. I thank you.

PRESIDENT: Mr. L. W. Hicks is a very modest man and can not be induced to make a speech, but I will ask him to stand up so we may see him.

No Railway Club meeting would be complete unless we had a word from one whom we are always glad to hear, Mr. Frank J. Lanahan.

MR. FRANK J. LANAHAN: Mr. President and Fellow Members: So much time did I consume at the annual meeting just a month ago, that for quite a while to come, the members should be spared further ordeal. Much interested was I in the reaction indicated by the members to Senator Reed's talk. Mr. Stark aptly encompasses the situation in substance, that at this meeting we are just pupils in the great big economic school, gathered around the teacher as though it were the primary grade, listening to a master of English; a gentleman of wide experience, one whose contact with the affairs of the world should make him wholly competent to elucidate on the economic situation of the day, of which we have but limited understanding.

The subject with its diverging ramifications was intelligently handled, for our Senior Senator endeavored to be dispassionate and unbiased. After listening to Senator Reed's review of our economic dilemma, I somehow feel a good deal in the condition of a bunch of fellows after the Pitt-Nebraska football game, celebrating at one of the fraternity houses. It had been a great party, and many a toast had been indulged in over the victory that had come to Jock Sutherland's warriors. Well towards the wee small hours of the morning, when the participants had become more or less unconscious of what was going on around them, the host called a taxicab, and as he checked his inarticulate guests in the cab, he explained to the driver, "The fellow in the front seat goes to Webster Hall, the fellow along side of him, turn loose at the Fairfax Hotel. Take this fellow on the right rear seat to Center and Aiken, the apartment caty-corner from the Church, and dump this last fellow on the left rear at the fraternity house on Neville Street, just below

Bayard." The driver of the cab saluted, and as he started the motor, called out, "O. K." About five minutes later, as the host was removing the debris in the way of empty bottles and cigarette stumps, etc., from the table, he was disturbed by the loud knocking on the front door, and he recognized the voice of the taxicab driver, who shouted, "Say, you'll have to come down and sort these guys out again, for I hit a bump on Bellefield Avenue."

Evidently some of us feel we have been taken for a ride tonight, and the A. A. A., the N. R. A., the C. W. A., the R. F. C., etc., have encountered a bump in the Senator's discourse.

PRESIDENT: I see Mr. Crawford, one of the most faithful of our old time Presidents. We would like a word from him.

MR. D. F. CRAWFORD: Mr. President and Gentlemen: It has been a great pleasure for me to be here and to listen to Senator Reed's very illuminating description of what we have all tried to follow as best we could in the daily press. I have tried to follow it carefully but, I have received more light tonight than I ever had before.

PRESIDENT: Professor Endsley, have you anything to add?

PROF. LOUIS E. ENDSLEY. I do not think I have anything to say. I am sure I have enjoyed the address.

PRESIDENT: Mr. Flinn, we ought to hear from you.

MR. R. H. FLINN: Mr. President and Gentlemen: It goes without saying that we have all enjoyed very much the Senator's very illuminating presentation of the present situation. We have all read about this in the magazines and the newspapers and other sources of information but I for one have a much clearer understanding of the whole picture in my mind because I feel some how that a man who has been there in the midst of it ought to be able to make it a little clearer than the written word. I do not want to make a political speech, with apologies to the Senator, but I do want to appeal to you gentlemen and say that one of the most important things in this country is for the average citizen to pay some attention to what is going on in Washington. And I do not think it has to be confined entirely to Washington. There are many other places where our attention might be very profitably occupied. We face a serious situation.

Mr. President, after this very wonderful presentation which Senator Reed has made to us tonight I feel that we owe him a rising vote of thanks, and I would therefore move that we express our sincere appreciation of his splendid talk tonight by a rising vote of thanks.

MR. FRANK J. LANAHAN: In seconding that motion, may I ask to have included, Mr. Rossell, for his very delightful and informative introduction of the speaker of the evening?

The motion was unanimously carried with much applause.

MR. F. H. STARK: Before we adjourn I think we ought to have a word from Mr. Code, another of our earlier Presidents.

MR. J. G. CODE: I think Mr. Stark is out of order. I have done nearly everything on a railroad except to interfere with traffic by operating a tower. I am not competent to discuss what is going on in Washington.

PRESIDENT: If there is nothing further at this time, the usual luncheon has been prepared and a motion to adjourn will be in order.

Upon motion, Adjourned.

J. D. CONWAY, Secretary.

In Memoriam

J. T. CAMPBELL,

Joined Club January 23, 1919

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OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 2.

Pittsburgh, Pa., Dec. 21, 1933

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H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933

†—Resigned.
*—Deceased.

PROCEEDINGS OF MEETING

DECEMBER 21, 1933

The meeting was called to order by President C. O. Dambach at 8 o'clock, P. M. in the English Room of the Fort Pitt Hotel.

Attendance, as shown by registration cards collected at door, 179, as follows:

MEMBERS

Ament, F. C.
Baer, Harry L.
Barr, H. C.
Batchelar, E. C.
Beam, E. J.
Berg, Karl
Berghane, A. L.
Best, D. A.
Blackmore, G. A.
Bone, H. L.
Buffington, W. P.
Carlson, L. E.
Carr, T. W.
Carruthers, G. R.
Chilcoat, H. E.
Church, S. L.
Cipro, Thomas
Clark, C. C.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Cotter, G. L.
Crawford, A. B.
Crawford, D. F.
Cruikshank, J. C.
Cunningham, R. I.
Dambach, C. O.
Davis, Charles S.
Dehne, George C.
Dempsey, P. W.
Down, S. G.
En Dean, J. F.
Endsley, Prof. Louis E.
Farmer, C. C.
Flinn, R. H.
Forsberg, R. P.
Frauenheim, A. M.
Frauenheim, P. H.
Freshwater, F. H.
Gatfield, Phillip
Gilg, Henry F.
Gillespie, J. Porter
Glenn, J. H.
Haller, Nelson M.
Hancock, Milton L.
Hansen, William C.
Harman, H. H.
Harper, G. C.
Hilstrom, A. V.
Holmes, E. H.
Huff, A. B.
Hughes, John E.
Huston, F. T.
Irwin, R. D.
Kapp, A. C.
Kaup, H. E.
Kentlein, John
Kirk, W. B.
Kraus, Raymond E.
Kromer, William F.
Kummer, Joseph H.
Landis, William C.
Logan, J. W., Jr.
Long, R. M.
Longdon, C. V.
Lowry, William F., Jr.
Lynn, Samuel
Maliphant, C. W.
Mason, S. O.
Masterman, T. W.
Mayer, L. I.
Millar, C. W.
Mills, C. C.
Misklow, C. J.
Misner, G. W.
Mitchell, W. S.
Morgan, A. L.
Morgan, Homer C.

Moore, Donald O.
Muir, R. Y.
Murray, Stewart
McAbee, W. S.
McCune, J. C.
McFetridge, W. S.
McHugh, C. A.
McKinley, John T.
McKinstry, C. H.
McNamee, W.
Nagel, James
Nash, R. L.
Paisley, F. R.
Passmore, H. E.
Purchard, Paul
Rauschart, E. A.
Record, J. F.
Renshaw, W. B.
Richardson, E. F.
Robinson, R. L.
Rossell, R. T.
Rudd, W. B.
Rutter, H. E.
Sekera, C. J.
Seiss, W. C.
Smith, H. K.
Stein, J. A.
Stevens, R. R.
Stoffregen, L. E.
Stucki, A.
Sutherland, Lloyd
Thomas, Frank B.
Thomas, Theo.
Trax, L. R.
Weaver, W. Frank
Whalen. D. J.
Wikander, O. R.
Wilharm, J. H.
Woods, G. M.
Wright, John B.
Yarnall Jesse

VISITORS

Beswick, R. G.
Birt, Thomas C.
Bryant, L. J.
Buenting, O. W.
Burns, R. C.
Burriss, H. E.
Burriss, W. C.
Carroll, F. E.
Cattell, L. E.
Clausen, H. C.
Code, C. J.
Cox, Walter D.
Crittenden, P. L.
Dickson, K. B.
Dunham, C. W.
Eastan, J. W.
Eichhorn, T. F.
Failor, Charles W.
Farmer, George C.
Fitch, E. R.
Glenn, Frank R.
Goodwin, A. E.
Groffus, Paul B.
Hackleroad, R. E.
Hammer, C. F.
Hardman, Willard M.
Heinrichs, R. M.
Horner, W. M. C.
Jados, Walter T.
Kemmerer, R. R.
Leonard, Ross C.
Lewis, S. B.
Lind, B. C.
Logan, W. J.
Macfarlane, C. E.
Miller, R. E.
Moeller, F. J.
Musgrove, W. W.
McWhirter, W. C.
Nirella, Joseph D.
Pennington, F. W.
Priest, H. M.
Reeder, N. S.
Rensch, R. H.
Robinson, H. J.
Rushton, H. J.
Schreiber, L. J.
Schrontz, S. B.
Sexton, E. P.
Sims, Charles A.
Smith, Sion B.
Stanger, John J.
Steffler, Walter H.
Stotler, Harvey K.

Wallace, H. A.	Wilson, W. H.
Walters, C. R.	Work, Edgar A.
Weight, L. S.	Staples, E. I.

PRESIDENT: The roll call will be dispensed with as we have a full record of attendance on the registration cards.

If there is no objection the reading of the minutes of the last meeting will be dispensed with as the minutes are already in print.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

McKisson, R. W., Sales Agent, American Steel Foundries, 410 N. Michigan Avenue, Chicago, Ill. Recommended by F. I. Snyder.

Reeder, N. S., Pressed Steel Car Company, McKees Rocks, Pa. Recommended by R. H. Flinn - C. C. Clark.

PRESIDENT: In accordance with our By-Laws these proposals will be referred to the Executive Committee, and upon approval by that Committee the gentlemen will become members without further action of the Club. Are there any communications?

SECRETARY: Since our last meeting we have received information of the death of two of our members: Carl L. Laughner, General Foreman, Pressed Steel Car Company, died October 31, 1933, and Arthur D. Pringle, Supervisor Wage Schedules, Monongahela Railway, died June 20, 1933.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings.

If there is no further business, we come to the paper of the evening. The paper tonight is on the A. B. Brake, "Freight Brake Requirements and Related Economics", which will be presented by Mr. C. C. Farmer, Director of Engineering, Westinghouse Air Brake Company, Wilmerding. Mr. Farmer is recognized as an authority on air brake matters and needs no introduction to this Club. We feel highly honored to have among our membership such a man to present a paper of this nature. This subject, dealing with the air brake, is one with which we are all more or less familiar as a matter of fact. It is interesting to look back to 1868, when George Westinghouse introduced the air brake. Prior to that time we had the steam jam on our locomotives and hand brakes on the freight cars. The introduction of the air brake did not eliminate the steam jam but simply transferred its activities. We still had the steam to supply the air in order to make the jam a little more effective. However since that time there have been a lot of improvements in the air brake. And the A. B. Brake which Mr. Farmer is going to tell us about tonight is possibly more properly called the B. A. Brake, and Mr. Farmer will tell you that this A. B. Brake will B. A. Brake and if it is there will be a lot of economics in the railroad industry.

I take a great deal of pleasure in presenting to you Mr. C. C. Farmer.

THE "AB" BRAKE

Freight Brake Requirements and Related Economics

By C. C. FARMER,
Director of Engineering, Westinghouse Air Brake Co.

Within recent years changes in railroad requirements have necessitated the operation of faster, heavier and longer freight trains than those for which the "K" Triple Valve was designed, and it became necessary for the railways to determine whether the longer and heavier modern trains could be safely and expeditiously controlled and stopped. To this end the American Railway Association made extensive rack and road tests under the direction of their Director of Research, Mr. H. A. Johnson.

These tests were originally planned for trains of not more than 100 cars, but, at the completion of the rack tests at Purdue University, the American Railway Association decided to extend their investigation from 100 to 150 car train limits. It was known that, the "K" Equipment would be found unsatisfactory for control of modern trains, and therefore these valves could not serve the purpose of determining what brake functions were needed and it followed that the American Railway Association must have new and special brake control elements for this purpose.

To meet requirements of the tests the Westinghouse Air Brake Company devised and furnished special brake devices which they believed necessary for the purpose. The earlier of these were designed on the basis of 100-car train limits and the later for 150-car train limits. These special brake devices were arranged for convenience of the investigation and, therefore, were not in commercial form.

In order that an adequate study and analysis might be made of the effect of propagation rates in service and emergency brake applications on train slack control, we also devised and furnished electrically controlled mechanisms, by the use of which the rate of brake application propagation could be changed as desired without reconstructing the brake devices.

These experimental brake and the research mechanisms permitted the American Railway Association to secure definite knowledge of the requirements for safely controlling modern freight trains without which the report of their Director of Research must have been generally limited to the conclusion that the functioning of the "K" Equipment was inadequate for modern freight train service.

The results of the American Railway Association tests, with the special equipments and appliances referred to, provided definite data as to limitations and values which could only have been secured in this manner.

In line with their long established practice the Westinghouse Air Brake Company cooperated fully with the railroads in determining brake standards and operating and maintenance practices which provide the maximum safety and economy in the operation of trains.

Technical description of the operation and discussion of the many important supplementary features of the "AB" brake will not be included because they are well covered in the Westinghouse Air Brake Company's Publication No. 9080, "The AB Freight Brake Equipment", which will be furnished on request, and in the several papers on this subject recently presented before various railroad clubs.

Application of Train Brakes

Brake pipe reductions are normally initiated with the engineer's brake valve, therefore the forward train brakes apply first. If the triple valves of the individual cars were not so arranged as to make a local brake pipe reduction at either a service or emergency rate as each triple valve responds, all of the air to be discharged from the entire length of the brake pipe for any brake application would have to be vented to atmosphere through the brake valve.

The resistance to flow of air through the long brake pipe is relatively high due to natural laws and, therefore, without the supplementary venting of brake pipe pressure at each car, the reductions of brake pipe pressure would be very slow, the action of the brakes erratic, the interval of time between the application of brakes on the front and rear cars would cause excessive slack shocks, and the distance required to stop modern length trains would be intolerable.

For the reasons given the application of train brakes must be serial starting from the point at which the brake pipe reduction is initiated. Each triple valve thus started must function to produce either a service or emergency application, depending upon the rate at which the brake pipe reduction is initiated at the brake valve. It follows that there is and must be a time interval between the application of the front and rear brakes of the train, the natural result of which is to initiate a closing movement of train slack.

Train Slack Control

The American Railway Association road tests proved that the brakes devised for 100-car trains or less were not capable of controlling the train slack movement in the longer modern trains so as to avoid producing excessive shocks. They found that this was due to too much time elapsing between the application of front and rear car brakes and that the shocks thus initiated were greatly magnified by the development of too much brake cylinder pressure on the front cars, before the brakes on the rear cars developed an effective retarding force.

It was also determined that the action of the locomotive brakes was an important factor in train slack control. When too much retarding force was developed by locomotive brakes before the train slack closed, the velocity of train slack closure was increased and the shocks were of objectionable degree because of the concentrated weight of the locomotive serving as a bumping block.

It was definitely determined by the road tests, through use of the special electrically actuated mechanism, combined with various adjustments of the control of the rate of development of brake cylinder pressure, that the slack in trains of up to 150 cars could be safely controlled in both service and emergency applications.

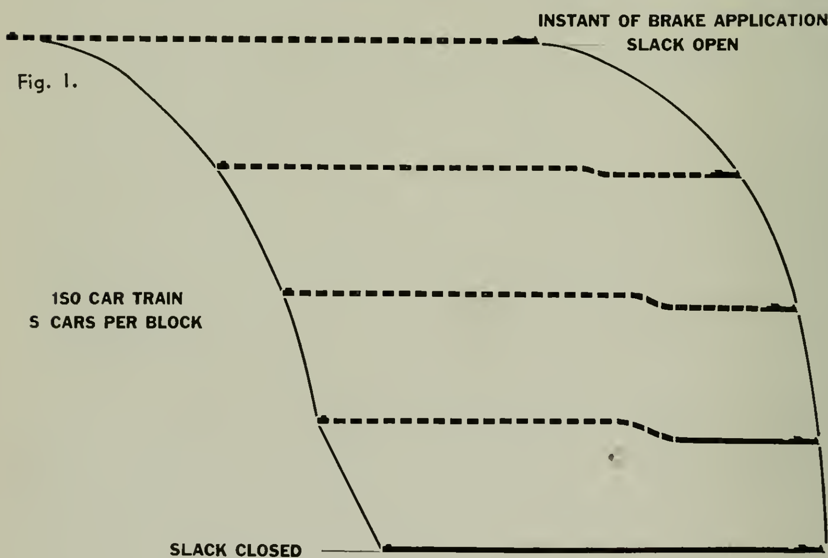
The experimental equipment known as FC3A which was under development at the time the tests were made with the electrically controlled mechanism, included features of construction which accomplished the needed rate of pressure development for safe control of train slack and these were later proven to be adequate for this purpose by the road tests.

The features involved were later incorporated in the commercial brake structure designated the "AB" brake and their adequacy was further proven by the American Railway Association road tests of the "AB" Equipment 150-car train at Johnstown, beginning in March 1933, and, later, by general road service operation tests with coal trains on the Chesapeake & Ohio Railway.

The common conception of the movement of train slack during brake applications is that immediately after the brakes

APPROXIMATE TRAIN SLACK CLOSURE MOVEMENT DURING BRAKE APPLICATION

Fig. 1.



start to apply on the front cars, the slack, starting from the first car, closes serially through the train. The manner in which train slack actually closes with train brake applications, as observed during the extended road service brake trials and studies, is graphically illustrated by Fig. 1.

The trains pictured on this diagram are intended to represent 150-car trains, but for convenience only 30 cars are shown so that each car on the diagram represents 5 cars in an actual train. The data for slack action as shown is taken from an actual road test of a 150-car empty train and is an emergency application at an initial speed of 12 miles per hour.

This diagram shows that the initial slack closure movement occurs almost uniformly in a group of cars in the front portion of the train, during which the speed of this group of cars is reducing and, when their slack is consolidated, the buff then apparently starts at the front car and the slack closure is serial through the train. It was also observed that the velocity of slack closure and the resultant buff, increased with the progress of the slack closure through the train. This is due to the continued development of retardation on the front cars during the train slack closure and the mass of the forward cars being too great for the impact buff of the individual cars as they close in to accelerate the front cars enough to materially relieve the resultant shocks.

Service Application

The American Railway Association tests provided official record of the fact that the brakes devised for less than 100-car trains would not apply all of the brakes in modern length trains which were in good road service condition, unless the initial brake pipe pressure reduction exceeded the amount which is established as good practice.

This was due primarily to the fact that the propagation of the brake pipe reduction by quick service was not sufficient to close the back flow communication between the auxiliary reservoir and brake pipe in the middle and rear cars. The air from the auxilary reservoir returning to the brake pipe and flowing toward the brake valve then supplied the air vented from the brake pipe by quick service action of the valves and thereby stopped the quick service reduction of brake pipe pressure and the propagation of the brake application before it reached the middle of the train.

It is obvious that with brakes applied only on the front portion of the train the stopping distance must be excessive and, further, that an uneconomical burden of work is placed on the wheels and brake shoes in the forward portion of the train. It will be appreciated that the limitations cited necessitate the incorporation of means in an improved brake structure through which all brakes in modern trains will be applied by moderate brake pipe reductions.

It will also be apparent that to secure economical distribution of retarding force, quick service action must apply all brakes with a degree of force which will accomplish the predetermined and tolerable maximum of retarding force on all cars which is consistent with the fastest possible propagation rate of the brake application.

The reasons why the quick service functioning of the "K" Equipment was not adequate for trains longer than those for which they were designed and the means employed for securing dependable functioning in the "AB" brake are as follows:

The quick service actuating ports of the "K" Triple Valve are not opened until the piston has moved the main slide valve from the release to quick service position. This, theoretically, should occur when the brake pipe pressure has been reduced about 1½ lbs. below that of the auxiliary reservoir, but in train

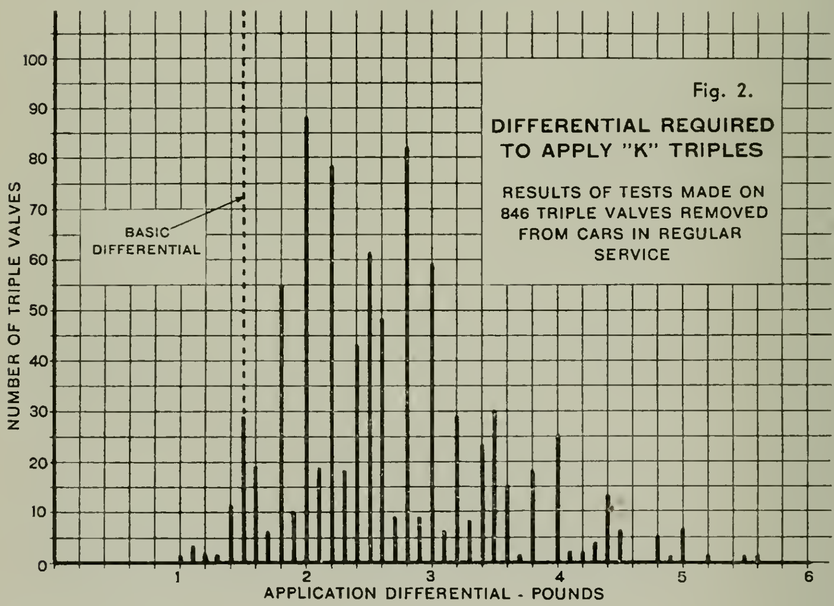


Fig. 2.
DIFFERENTIAL REQUIRED TO APPLY "K" TRIPLES
RESULTS OF TESTS MADE ON 846 TRIPLE VALVES REMOVED FROM CARS IN REGULAR SERVICE

service it varies with the uncontrollable variation in frictional resistance to the movement of the main slide valve.

The actual degree of variation in brake pipe reduction necessary to initiate quick service action with "K" Triple Valves in everyday train service is shown in Fig. 2, which is a graphic record of the actual brake pipe reduction required to accomplish the application movement of over 800 "K" Triple Valves which were removed from cars in regular service and tested with special mechanism by which the brake pipe reduction to apply was accurately measured.

In quick service operation of triple valves, the brake pipe reduction, normally initiated at the brake valve, causes the adjacent triple valves to move to their quick service position where they make a further local reduction of brake pipe pressure. This carries the needed initial fast brake pipe reduction to the next valve and, serially, throughout the train.

As the time to accomplish brake pipe reductions must increase with the amount of reduction required, the increased brake pipe reduction needed to move the parts of individual valves having high friction, results in an increased time to initiate quick service at each valve. It follows, that the time required to propagate quick service through the train is thereby increased and the dependability of the quick service functioning decreased.

In the "AB" Equipment the initial quick service action of the valve is controlled by the graduating valve alone. This valve is very much smaller than the main slide valve and, while subject to approximately the same percentage of change in its frictional resistance as the main slide valve, the maximum possible resistance to movement is too low, due to its size and to the piston diameter used being larger than in the "K" triple valve, to appreciably change the brake pipe reduction needed to initiate quick service movement.

By the construction just cited, the differential required to start the piston and the graduating valve from their release position is also too low to provide adequate stabilization of the valve against undesired applications being initiated by the minor but unavoidable fluctuations in brake pipe pressure which occur in everyday service.

The needed stabilization against undesired quick service action is accomplished by a spring backed stop in the stem of the piston. This stabilizing spring resists the piston movement only after the auxiliary reservoir charging port (feed groove) has been closed and before the quick service port is opened.

With this construction the brake pipe reduction needed to initiate quick service action of the brake is governed by a spring of uniform and predetermined value plus the almost negligible graduating valve friction and, therefore, the desired differential on the piston is substantially independent of any frictional variations. This insures that the quick service action of the "AB" brakes will be uniform, reliable and as fast in its rate of propagation as is practicable without interference with other important functions of the brakes.

The "K" quick service functioning is limited and stabilized by so restricting the flow of brake pipe air to the brake cylinder so that in quick service position of the slide and graduating valves the auxiliary reservoir pressure is reduced faster than the brake pipe pressure when the brake pipe volume is the minimum common to cars of twenty-five years ago and the brake pipe leakage is maximum. Under these conditions the activity or vigor of the quick service is maximum but, when the brake pipe volume per car becomes relatively large, as in modern cars, and the leakage is decreased, as is good and economical practice, the quick service activity is much reduced.

The design of the "K" Equipment was determined by conditions of 25 years ago when the brake pipe volume per car was small, the average leakage rate was high, the average train length was about 50 cars, and the maximum train length was about 80 cars. The functioning of "K" type quick service was adequate for these conditions and it had sufficient margin to give satisfactory performance under the gradually changing conditions until the average train length reached 100 cars and the brake pipe length per car began to exceed 45 ft.

The value of the "K" Equipment quick service, under average normal conditions, is such that the brake pipe reduction will be around 5 lbs. and produce only about 4 lbs. brake cylinder pressure. This is not sufficient to produce effective retarding force on the cars because this amount of cylinder pressure is required to overcome the resistance in the brake cylinder and foundation brake rigging and move the brake shoes into contact with the wheels.

The low initial quick service value of the "K" Equipment was acceptable in the trains for which the "K" Equipment was developed because there the brake pipe length was short enough to permit a further reduction of brake pipe pressure to be made with reasonable promptness by the discharge of brake pipe air at the brake valve.

With the longer modern trains the length of the brake pipe is such as to extend the time required to increase the brake pipe reduction in the rear portion of the train and, further, this increased reduction can only be accomplished at a tolerable rate by producing more than the desired brake pipe reduction and brake application at the front of the train. It follows that the degree of quick service activity of the "K" triple valve for initial applications is insufficient.

To overcome this limitation of the "K" Equipment, the "AB" valve is provided with a different form of quick service which has three distinct stages, as follows:

First, a small predetermined brake pipe reduction to a measuring chamber at a relatively rapid rate initiates similar quick service action of the triple valve on the adjacent car and thus from car to car serially and quickly throughout the train.

Second, each brake then continues to discharge brake pipe air to the atmosphere at a slower rate until the reduction is sufficient to apply the individual brakes.

Third, the slide valve moves to cut off the quick service chamber and the brake pipe air now flows to the brake cylinder until the cylinder pressure value is 9 to 10 lbs.

The quick service action described insures: that all brakes will apply with the moderate initial reduction of brake pipe pressure, that the time interval between the application of front and rear brakes is the practicable minimum, and that all brakes will be applied with a predetermined brake cylinder pressure sufficient to produce effective retarding force. It will be recognized that the brake action described completely overcomes the limitations which have been cited concerning the quick service action of the "K" triple valve.

Emergency Application

The Oregon tests of the American Railway Association established that brake equipments which were devised for shorter than 100-car trains produced excessive slack closure shocks when emergency applications were made on the longer modern trains. This result was due to two factors: too large an interval of time between the application of the front and the rear brakes, and the development of too much retarding force on the front end cars prior to the development of effective retarding force on the rear cars.

The correction needed to prevent the prohibitive slack action was, first, to accomplish a major increase in the rate of propagation of emergency application through the train, thereby reducing the time interval between the application of the front and the rear brakes; and, second, to limit the rate of development of brake cylinder pressure in the front brakes to that degree which would not cause the front end to be prohibitively retarded in a of the application of brakes on the rear portion of the train.

The conclusions reached from tests made by the use electrically actuated mechanisms were confirmed by tests of the experimental FC-3-A Equipment.

The first function in the emergency quick action of the brakes is the serial venting of brake pipe pressure at a maximum rate so as to propagate the brake application throughout the train in a minimum time. This is analogous to the quick service action in which only the movement of the piston and a small graduating valve is involved in propagating the service application at maximum speed through the train. Like in service application, following the propagation of the emergency application, the valve parts are so moved as to initiate and control the application of the individual brakes.

The "AB" Equipment is arranged to develop emergency brake cylinder pressure in three distinct stages so as to accomplish the quickest development of the maximum brake cylinder pressure permissible without reducing the speed of the front cars of the train excessively before the rear brakes become effective.

The first stage is a rapid inshot of 15 lbs. pressure. In this stage the brake cylinder is filled and built up to a pressure of 15 lbs. in a time of about ½ second. This pressure is sufficient to overcome the brake cylinder and rigging resistance and provide the amount of retardation on the head cars needed to initiate closure of train slack without objectionable roughness.

The second stage is a gradual increase of the brake cylinder pressure from 15 to 47 lbs. in a time of 7 seconds. This stage accomplishes the continued development of retardation on the head cars slowly enough to permit the rapid propagation of brake action to establish effective retardation on the cars farther back towards the rear before excessive speed differences are created within the train.

The third or final stage is a rapid increase of the cylinder pressure from 47 lbs. to the final maximum pressure of 60 lbs. This stage of pressure increase is accomplished in a time of about 1½ seconds and represents the development of a final braking power value which is 20% greater than the maximum value for service application.

Emergency Following Service Application

The American Railway Association tests provided record of

... f the "K" Equipment to propagate quick action applica- ... ain brakes following moderate service applications. In ... s the available brake cylinder pressure for stopping a train is limited to the full service brake value and this is slow in developing in trains of modern length because the triple valves cannot vent brake pipe air locally at the emergency rate. It follows that the stopping distance is greater than it would be if quick action operation of all brakes was available.

Another result of the failure to secure emergency brake action following service application, is to quickly develop full service brake value and possibly partial emergency value at the front of the train adjacent to the brake valve, where the brake pipe pressure can be quickly reduced. The results of the unbalanced brake forces thus produced, such as buffs or heavy compression forces, vary with the position of train slack at the time the emergency application is attempted.

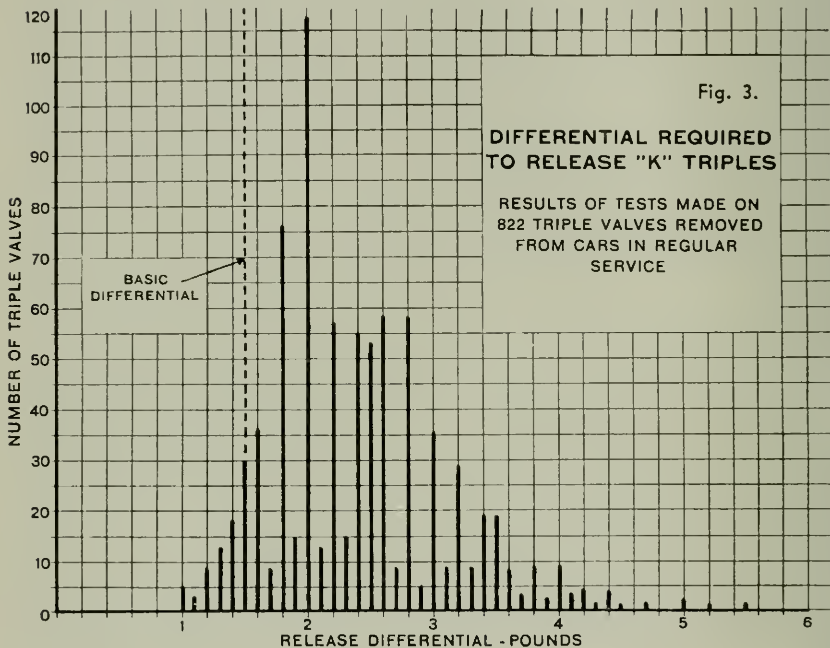
The inability of the "K" Equipment to propagate emergency following service applications was of less than major importance with the relatively short trains operated at the time the "K" triple was standardized some twenty years ago, but this limitation has changed to major importance with the longer modern trains which are operated at higher average speed.

For the reasons given the "AB" brake is so constructed that the emergency action with increased pressure is available irrespective of any existing stage of brake application or release, including cases where the brake pipe pressure may have been reduced below the amount needed to make a full service application or where the train charge is as low as 20 lbs. Further, the rate of propagation of emergency brake action remains substantially constant at all brake pipe pressures encountered in every day service.

Release of Service Application

While the release functioning of reasonably good condition "K" Triple Valves was prompt and dependable on the length of trains operated at the time they were standardized, it is well known that the time required with them to release service applications in modern length freight trains causes delays to the movement of the train and also that stuck brakes and slid flat wheels sometimes occur. These troubles are commonly due to three causes: (a) the rate at which the brake pipe pressure can be increased; (b) the resistance of the triple valve slide valve to release movement; and (c) the degree of existing packing ring leakage.

Referring to (a), the rate at which the brake pipe pressure can be increased: As the "K" triple valve moves to release position it opens the charging port from the brake pipe to the auxiliary reservoir and thereby adds the volume of the auxiliary reservoir



to the brake pipe volume and this added volume is approximately three times that of the brake pipe. Therefore, the rate of brake pipe pressure increase becomes slower as each brake releases and it follows that release movement of all other brakes is delayed. The triple valves which require the higher increase of brake pipe pressure to move them to release position are thereby greatly delayed in accomplishing release movement and more time is provided for packing rings which are not in perfectly tight condition to recharge the auxiliary reservoir by leakage without releasing the brakes.

To accomplish the badly needed increased rate of brake pipe pressure rise during release, the "AB" Equipment is so devised that when the piston and slide valve of each brake move to release position, the high pressure air stored in the emergency reservoir is permitted to flow back to the auxiliary reservoir at the rate of brake pipe pressure increase, thus preventing any flow of air from the brake pipe to the auxiliary reservoir until after equalization occurs between the emergency and auxiliary reservoirs.

The effect of the functioning described is to reduce the volume of air to be flowed through the brake pipe during release to nearly one-fourth that required with the "K" triple valves and it follows that, everything else being equal the rate of brake pipe pressure rise of the "AB" Equipment is very much faster than can be accomplished with the "K" Equipment.

Referring to (b), the effect of frictional resistance on dependability of release and the time required to release train brakes: To secure definite knowledge of the degree of frictional resistance actually occurring in "K" triple valves in everyday road service, more than 800 triple valves were removed from cars in service and their resistance to release movement was accurately measured.

The records of these tests are shown in Fig. 3. From these graphic records it will be seen that, while a considerable number of these valves would release with 1½ lbs. increase of brake pipe pressure, which is the value employed in the design of the brake, a large percentage of them required a much higher increase of brake pipe pressure and some as much as 5 lbs.

Friction is one of the most unstable factors and it is unavoidable that the frictional resistance of the slide valve to release movement varies over a considerable range.

The resistance to triple valve piston movement from service lap to release position is due to the frictional resistance of the slide valve required for setting up the various port combinations needed for proper brake functioning.

The range of frictional resistance of the slide valve cannot be kept within sufficiently narrow limits to meet requirements of modern train braking. This necessitates the incorporation of means in an improved freight brake by which the triple valve will be moved to release when a predetermined minimum increase in brake pipe pressure is developed, independent of the friction resistance of the valve parts to release movement.

The effect of frictional resistance to the release movement of the slide valve was overcome in the "AB" Equipment by the incorporation of the release insuring feature which functions to reduce the auxiliary reservoir pressure a sufficient amount to accomplish the release movement of the piston and slide valve whenever the brake pipe pressure is increased about 1½ lbs. above the pressure of the auxiliary reservoir.

When the resistance to release in any valve is less than 1½ lbs., the function of the release insuring valve is not needed and it does not operate. When the release insuring valve does function it can reduce the auxiliary reservoir pressure only to that exact amount needed to release the brake.

Referring to (c), the degree of existing packing ring leakage: We have in recent years developed an improved triple valve packing ring with which the average ring leakage during extended service periods is only a fraction of the leakage which occurred with the former standard ring. These rings were employed in the FC-3-A experimental equipment, are standard in the "AB" Equipment, and their incorporation in the "K" Triple Valves in railroad repair shops is largely responsible for the "K" Equipment performing its release functions as well as it does in modern length trains.

Release of Emergency Applications

It is well known that one of the most likely conditions for failure of brake release in long freight trains equipped with the "K" triple valves occurs following emergency applications and particularly when they result from burst hose or the brake pipe is left open until its pressure is very low or completely exhausted. This critical condition for release failure comes about through:

First, the higher auxiliary reservoir pressure occurring with emergency than with service application.

Second, the slower rise of brake pipe pressure due to the flow of brake pipe air to the auxiliary reservoir as soon as each brake releases, and

Third, the high frictional resistance to release movement of a large percentage of the triple valves.

When releasing "AB" Equipment emergency applications, the three features which accomplish improvement in the release functioning, as described under "Release of Service Applications", are fully effective, i. e. faster increase of brake pipe pressure, lower and uniform differential of pressure to accomplish release movement of the valves and lower average packing ring leakage.

After emergency application the equalized pressure of the brake cylinder and auxiliary reservoir is 60 lbs. for the "AB" Equipment and 55 or 56 lbs. for the "K" Equipment.

To avoid the detrimental effect of the high auxiliary reservoir pressure after emergency applications, the "AB" Equipment is provided with the emergency release accelerating feature. This feature functions to vent the auxiliary reservoir and brake cylinder of each brake to the brake pipe when the brake pipe has been recharged to approximately 20 lbs.

The effect of the operation of this emergency release accelerating feature is to reduce the auxiliary reservoir pressure which must be overcome to release brakes and quickly increase the brake pipe pressure through the train to a pressure only a few pounds below that required to release the brake.

Control on Descending Grades

In grade braking it is generally necessary to employ retaining valves, the functions of which are to reduce the rate of exhaust of air from the brake cylinders during release of train brakes and to close the exhaust when brake cylinder pressure has been reduced to some predetermined pressure. It is desirable that the retaining valves be used on nearly all of the cars of the train to assist in regulating the train speed, to control the movement of train slack and to distribute wheel heating and brake shoe wear.

The quick service features of the "K" triple valves devised for operating trains of less than 100 cars so operate as to produce an initial brake cylinder pressure of substantially 4 lbs. The actual brake cylinder pressure developed is the 4 lbs. gage pressure, plus the 15 lbs. required to fill the displacement of the cylinder or to bring the cylinder pressure from absolute zero to zero gage pressure. The actual increase in brake cylinder pressure is, therefore, 19 lbs.

The quick service action of the triple valves is substantially the same whether application is started from a brakes-released condition or with pressure retained in the brake cylinder by the retaining valve. It follows that the minimum increase of brake cylinder pressure produced by reapplication of brakes while controlling on a descending grade, is substantially 19 lbs., which is more than can commonly be used without excessive reduction of the train speed.

To avoid the trains being stalled by this excessive increase of brake cylinder pressure it is common practice to use only a portion of the retaining valves, which results in overheating the wheels and brake shoes of the cars having the retaining valves operative, because the brakes on the cars without the retainers operative have a negligible value toward controlling the train speed. It follows that a smaller minimum increase in brake cylinder pressure during the control of trains on descending grades is very desirable.

Again, the 4 lbs. brake cylinder pressure developed by quick service activity of the brake when starting with the brakes in completely released condition, is commonly found to be insufficient to secure prompt control of train speed when entering upon a descending grade. This necessitates an increased reduction at the brake valve to secure the additional brake cylinder pressure needed, and, therefore, the train speed is sometimes well above that desired before the required retarding force can be accomplished.

From the foregoing it follows that the quick service feature of an improved freight brake should so function as to produce a higher brake cylinder pressure for the initial application when entering a descending grade, and a smaller increase in brake cylinder pressure than is produced by the "K" triple valves, when brakes are reapplied during cycling on a descending grade.

These requirements are accomplished in the "AB" brake which develops an initial brake cylinder pressure of substantially 10 lbs. for applications initiated from a brakes released condition and an increase of 9 lbs. over pressure retained in the brake cylinder. It follows that, with the "AB" brake, trains can be more promptly brought under control when entering a descending grade and that the increase in brake cylinder pressure during reapplications on the grade is low enough to prevent excessive reductions in train speed.

Protection of Car Brake Devices Against Dirt

Dust and grit, against which the"K" Equipment is not adequately protected, destroys the lubricant in valve devices and brake cylinders by changing it to a gummy abrasive substance which causes a rate of wear of moving parts that we conservatively estimate to be at least ten times as rapid as will occur with the parts in a cleanly condition. The iron oxide dust produced by internal rusting of the brake pipe is one of the most effective abrasives.

The rather frequent cleaning, relubricating and heavy repairs needed to maintain "K" Brake Equipment in dependable operating condition is a large item in the railroad operating expense, and it follows that an improved freight brake must include forms of construction which will avoid grit reaching the critical parts.

These requirements are met in the "AB" valve, first, by providing a dirt collector in the branch pipe which functions to catch and hold the heavier grit and small quantities of water; second, by leading the emergency exhaust from the brake pipe, away from the operating piston and other parts and directly to the atmosphere in place of to the brake cylinder as with the "K" Equipment; and third, placing an effective strainer in the branch supply to all valve mechanisms, except the vent valve which discharges brake pipe air to the atmosphere in emergency applications.

It has already been proven that the dirt protecting means provided are effective and it is expected that it will in time be accepted that the interval between the cleaning of "AB" freight brake equipment may be extended much beyond that required to maintain "K" equipments in dependable operating condition. It is also expected that the rate of wear of the vital parts, such as the piston packing rings, cylinders and slide valve seats, will be so reduced, as compared with the "K" Equipment, that the actual maintenance cost of the "AB" brake parts will be less than is involved in the maintenance of the "K" brake.

Brake Equipment Leakage

One of the large items of expense in the operation of freight train brakes has been compressed air lost through air leakage from the valve devices and pipe joints. Leakage in the valve devices is generally caused by wear of the parts. As the "AB" brake has special protection against the entrance of the abrasive iron oxide and other dust, a much slower rate of wear must result than is common to the "K" Equipment, and therefore, the air leakage lost through these valves is and must remain a smaller amount than occurs with the "K" Equipment.

The leakage from the piping generally occurs at the threaded and union joints which are loosened and broken by vibration and other stresses incident to the operation of freight trains. To practically eliminate such leakage trouble from the "AB" Equipment, all pipe joints on the brake branch pipe tee and between it and all of the brake devices are special reinforced flanged unions.

The record for approximately ten years service of over 25,000 of these reinforced pipe joints on freight cars in everyday coal service justifies the definite statement that leakage does not develop in them except in cases of damage such as occurs in wrecks.

Note:

An appendix is added containing a detail description with data charts and illustrative diagrams of the features referred to in the preceding discussion.

ECONOMICS

"AB" EQUIPMENT VS. "K" EQUIPMENT

The extent to which the "AB" Type Freight Brake Equipment will contribute to the more prompt and efficient conduct of railway freight service has been thoroughly established as the result of the most comprehensive and carefully conducted series of tests ever made for the purpose of determining the required characteristics of freight train brake equipment. As a result of these investigations, the fact is generally recognized that the "AB" brake is a potential agent in permitting faster schedules in every type of freight service whether long or short trains are involved and whether level or grade operations are considered.

When "AB" brake equipped cars are associated with cars having the familiar "K" brakes, it has been shown that the action of the scattered "AB" valves is such that their quick response to every brake impulse and their reliable and definite local influence, materially improves the efficiency of the associated "K" triple valves, and it is for this reason that the benefits of the "AB" Equipment in expediting freight train movement will be felt as soon as it is introduced upon the tracks of railway systems.

Besides permitting the acceleration of freight train schedules and adding to the safety of the service, the "AB" valve is designed to reduce costs of brake maintenance; to largely eliminate road delays traceable to the failure of brake equipment to operate as intended; to protect cars and lading against the damage which is frequently assignable to unreliable brake action; and to make possible and entirely practicable a marked reduction in brake pipe leakage, an important item in its relation to freight train operating costs.

It will be obvious to those reading the preceding discussion concerning the physical requirements of brakes for safe, adequate and economic control of freight trains of all lengths up to 150 cars, that these requirements can not be met without the use of different mechanisms than those which form the "K" Equipment.

While the "AB" Equipment was standardized for new freight cars, chiefly on the basis of meeting actual train safety and operating requirements as established by the American Railway Association, it was suggested that its use might result in a reduction of railroad operating costs sufficient alone to justify its cost to the railways. Believing that such information would be of value, the following were selected as a committee to secure and compile all available data:

Professor S. W. Dudley, Yale University.

Mr. H. M. Sperry, Public Relations Consultant.

Mr. L. K. Sillcox, Vice Pres., New York Air Brake Co.

Mr. C. C. Farmer, Director of Engineeering,
Westinghouse Air Brake Company.

The Committee's economic study of freight brakes shows estimated savings in railway operating costs resulting from the use of "AB" brakes. These savings alone seem to fully justify the expenditure involved in the use of these brakes on new cars and the conversion of the "K" Equipment now in service to "AB" as rapidly as may be found practicable

Fig. 4 is a fundamental schedule of equipments showing in detail the brake elements included in the equipment cost figures listed on Fig. 5.

Fig. 5 is the condensed result of the study of all data available and shows the cost of the "AB" Equipment installed on new cars, the cost of converting "K" Equipments now on cars to "AB", the estimated saving incident to the road service use and the maintenance of "AB" Equipment, the costs of carrying the investment and the approximate number of years required to amortize the net initial investment.

The savings accruing from installations of the "AB" Equipment, as shown on Fig. 5, are based on the net additional expenditure required to install the present standard "AB" Equipment over that required for installing the "K" Equipment.

The analysis of costs of railway operation with "AB" vs. "K" brake equipments, as shown on Fig. 5 and in detail by Appendix A, is based upon the best information available. It is believed that a careful study of the Committee's report will show their figures to be conservative and that an extended study of the subject will disclose further savings not included by the Committee.

Our purpose being to establish the actual facts concerning the economics of freight brakes, comments are solicited on the findings of the Committee and the supplementary statements showing how the savings figures were established, to the end that their study may be extended and the maximum assistance be given the railroads in their studies of the subject.

FIG. 4 "AB" FREIGHT BRAKE EQUIPMENT

Fundamental Schedule of Equipments listed on Figue 5.

EQUIPMENT DESIGNATION			#1	#2	#3
DETAILS OF EQUIPMENT	PIECE NUMBER		NO. REQUIRED		
	N.Y.A.B.	W.A.B.			
"AB" Control Valve, Complete, including reservoir release valve, service and emergency portions, and pipe bracket, complete with reinforced flange union pipe connections.	N-2788	94898	1	1	1
Combined Auxiliary and Emergency Reservoir, complete with reinforced flange union pipe connections.	N-2805	94843	1	1	1
10" Type "AB" Brake Cylinder, complete with reinforced flange union pipe connections.	N-2779	94973	1	1	1
Improved Branch Pipe Tee.	N-2814	94995	1	1	
Combined Dirt Collector and Cut-out Cock.	N-2821	94994	1	1	
Pressure Retaining Valve (See Note)	N-1533	86138	1		
1¼" Angle Cock (See Note)	N-1420	84311	2		
1⅜"x22" Hose with FP-5 Coupling and 1¼" Nipple (See Note)	N-1727	87101	2		

(1) Equipment #1—Complete new equipment with reinforced flange fittings for new cars.

(2) Equipment No. #2—Complete Changeover equipment with reinforced flange fittings for existing cars.

(3) Equipment #3—Partial Changeover equipment with reinforced flange fittings for existing cars.

NOTE: These items are common to the former standard "K" equipment.

FIG. 5 THE ANNUAL SAVING IN OPERATING AND MAINTENANCE COSTS ANTICIPATED FROM THE USE OF "AB" FREIGHT BRAKE EQUIPMENT

BRIEF EXPLANATION OF CREDITS CLAIMED

NOTE: Under column (S) for each equipment are listed those savings (items II A to F incl.) which will accrue on a single car basis. Column (T) for each equipment includes these savings, plus the additional savings in operating expense (items II G to R incl.) which will accrue **in their entirety** only when all cars are equipped with the "AB" equipment. It will be recognized that items II D to F and H to R. inclusive are of a character for which cost records are either not available or not kept in sufficient detail to permit the actual savings to be positively determined. It is obvious that each of these items has, or will have, a value in the operating costs of every railroad and, therefore, values have been assigned to them after most careful study and consideration of all available data and related information. It is expected that all of the values assigned will be recognized as well under the actual amount. However, if the value given for any particular item is thought to be excessive for some individual locality or railroad, it is believed the group estimate as a whole is admittedly most conservative. Therefore, the total savings anticipated from this group of items can and should be accepted as a minimum.

Equipment No. 1 (Complete new equipment with reinforced flange fittings for **new** cars.)
Equipment No. 2 (Complete change-over equipment with reinforced flange fittings for **existing** cars.
Equipment No. 3 (Partial change-over equipment with reinforced flange fittings for **existing** cars.

	Equipments For New Cars	Changeover Equipments For Existing Cars	
	Equip. 1	Equip. 2	Equip. 3
I INITIAL INVESTMENT "AB" EQUIPMENT OVER "K" FOR 1,000 CARS			
A. "AB" Brake equipment parts	$138,000	$128,660	$122.170
B. "K" Brake equipment parts	69,700		
C. Credit for "K" equipment parts when converting "K" to "AB"		5,000	5,000
D. Net additional investment for brake equipments parts	$ 68,300	$123,660	$117,170
E. Additional installation labor	3,500	3,500	3,500
F. Total net additional initial investment	$ 71,800	$127,160	$120,670

II ESTIMATED GROSS SAVINGS PER ANNUM	(S)	(T)	(S)	(T)	(S)	(T)
A. Savings in maintenance cost through extension of the present 8.59 months period between freight brake cleanings to a 36-month period. (Period of 8.59 months is the average from representative data on 4,312 cars of four major railways.)	$ 8,800	$ 8,800	$ 8 800	$ 8,800	$ 8,800	$ 8,800
B. Saving in operating cost through a reduction in train delays and switching expenses incident thereto due to uncertain brake action. (Estimated avoidable expenses not less than $2.50 per car.)	2,500	2,500	2,500	2,500	2,500	2,500
C. Saving in maintenance cost through reducing the number of slid flat, brake burned, and thermal cracked wheels caused by improper brake action. (Saving of $2.00 per car per year based on extensive survey of actual data of several representative railways.)	2,000	2,000	2,000	2,000	2,000	2,000
D. Saving in maintenance cost due to a reduction in brake shoe and wheel wear. (Analysis of brake shoe and wheel wear data on a large railroad system justifies estimate that 10% of this expense may be avoided by the better distribution and control of (1) brake shoe pressures on all wheels, and (2) wheel wear caused therefrom in the train accomplished by the "AB" equipment.)	280	280	280	280	280	280
E. Saving in maintenance cost due to a reduction in the number of running repairs necessary to maintain brake system leakage within tolerable limits. (Elimination of sources of leakages, breakage and other damage to brake equipment enroute will eliminate inspection, switching and maintenance expense estimated to amount to at least $0.15 per car per year.)	150	150	150	150	150	150
F. Saving due to a higher percentage of cars being available for service at all times. (Freedom from inspection delay and avoidable out of service time for the various causes listed above estimated to be the equivalent of saving the use of at least one day per car per year.)	1,000	1,000	1,000	1,000	1,000	1,000

G. Saving in operating cost through reducing brake system leakage. (Air Brake Association test data on 4,307 cars records common locations of leakages. New equipment structures eliminate a substantial number of these sources. Savings shown are for computed fuel costs alone, and do not include cost of water, compressor plant, wear and tear, lubrication, overhead, etc.)	930	930	460
H. Saving resulting from reduction in the claims for loss and damage to lading, exclusive of that caused by wrecks, but incurred by rought handling due to brake and slack action. (Item in freight loss and damage account allocated to rough handling (exclusive of wrecks) averaged over five-year period and 10% assumed avoidable through reduction of improper brake and rough train slack action.)	500	500	500
J. Saving resulting from reduction in the cost of damage to cars (including couplers, draft gears, underframes, superstructure, doors, etc.), exclusive of that caused by wrecks, but incurred by rough handling due to brake and slack action. (Average repair cost of active freight cars due to unnatural causes averaged over five-year period and 1% assumed avoidable through elimination of improper brake and intolerable slack action.)	1,000	1,000	1,000
K. Saving resulting from a reduction in the property damage through reducing the number of accidents due to inadequate brake functioning. (Five-year average of property damage allocated only to those brake failures which are certain to be eliminated by reducing rough handling and improper or inadequate brake action enroute.)	200	200	200
L. Saving in the cost of damage awards and legal expense incident thereto, resulting from a reduction in the number of personal injuries and deaths. (Five-year average of death and injury claim items, plus legal expense, allocated to brake failures which are assumed reducible through elimination of rough handling and improper brake action enroute.)	1,650	1,650	1,650

M. Saving in operating cost through the possibility of making slow down applications without risk of stopping. (Based on best available average over-all costs of stopping a freight train and elimination of costs of delays resulting therefrom.)		320		320		320
N. Saving in operating cost resulting from a reduction in the number of cases of train delays, parted trains, etc., caused by a failure of the brakes to release, or other improper brake action. (Estimated to be at least not less than four times the amount estimated for item M.)		1,280		1,280		1,280
O. Saving in operating cost due to a reduced delay in starting after a service stop. (Estimated as at least not less in amount than item M.)		320		320		320
P. Saving in operating cost due to a reduced delay in starting after an emergency stop, or after train has been purposely separated (cutting trains on crossings or for water, making repairs to train line connections, etc.) (Estimated as at least not less in amount than item M.)		320		320		320
Q. Saving in operating cost through the possibility of safely handling heavier tonnage trains at higher schedule speeds under modern level road operating conditions. (Continuance of hauling trains longer than common when the "K" brake was adopted and up to 150-car trains for which the "AB" brake is suitable, depends upon the use of the "AB" brake. The difference in cost of hauling the average tonnage in the fewer trains thus permitted is estimated to be not less than $2.00 per car per year, based upon an analysis of operating cost trends over the past ten years.)		2,000		2,000		2,000
R. Saving in operating cost through the possibility of safely handling heavier tonnage trains at higher schedule speeds under modern descending grade operating conditions. (The additional economies in grade operation are estimated at not less than $0.10 per car per year.)		100		100		100
S. Total gross savings.	$14,730	$23,350	$14,730	$23,350	$14,730	$22,880

III DEDUCTIONS FROM GROSS SAVINGS						
A. Additional annual reserve necessary to effect major repairs of "AB" valve after service life of 30 years.	$ 400	$ 400	$ 160	$ 160	$ 160	$ 160
B. Interest on net initial investment (item IF) at 6%.	4,308	4,308	7,630	7,630	7,240	7,240
C. Total deductions.	$ 4,708	$ 4,708	$ 7,790	$ 7,790	$ 7,400	$ 7,400
IV NET ESTIMATED SAVING PER ANNUM						
A. Gross savings (item IIS)	$14,730	$23,350	$14,730	$23,350	$14,730	$22,880
B. Total deductions (item IIIC)	4,708	4,708	7,790	7,790	7,400	7,400
C. Net annual savings (item IIS minus item IIIC)	10,022	18,642	6,940	15,560	7,330	15,480
D. Return on net initial investment (item IVC divided by item IF)	12.57%	25,96%	5.46%	12,24%	6.07%	12.83%
E. Approximate number of years required to amortize the net initial investment (item IF)	6.13 yr.	3.57 yr.	12.73 yr.	6.85 yr.	11.79 yr.	6.58 yr.

*The interest charge on the capital account involved in the cost of the "AB" brake to the railroads is based upon the legal maximum of 6%. It follows that the return upon the investment in new freight brakes will be improved as the actual interest rate paid is less than 6% over the period in which the brake cost is amortized.

Value for item IV E determined from formula $N = \dfrac{\log\left(\dfrac{SR}{Y} + 1\right)}{\log\ (1 + r)}$, where,

N = Required number of years,

Y = Amount set aside annually (item IV C),

S = Net initial investment (item I F),

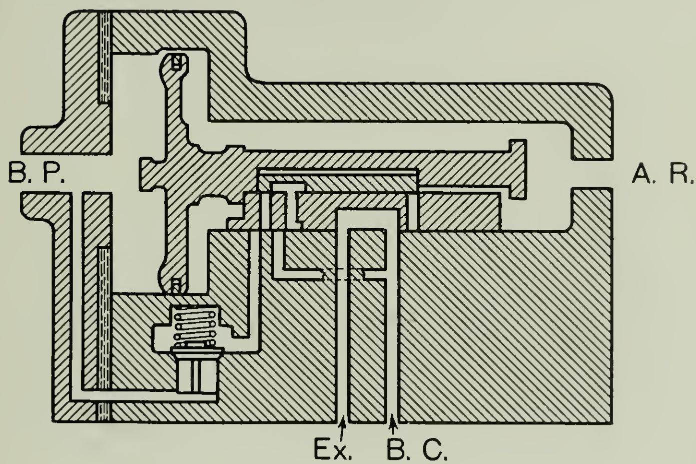
r = Interest per annum, compounded annually, expressed as a decimal.

APPENDIX

DIAGRAMS AND CHARTS ON FREIGHT BRAKE REQUIREMENTS

The following diagrams and charts are presented to illustrate the various features and performance comparisons of the "K" and "AB" brake equipments described in the preceding discussion of freight brake requirements.

FIG. 6 - "K" TRIPLE VALVE
RELEASE POSITION



SERVICE APPLICATION OF TRAIN BRAKES

"K" Equipment

The essential elements which control the quick service application of the "K" equipment are shown in the diagrams of Figs. 6 and 7. These diagrams are identical except for the position of the piston, graduating valve and slide valve. These parts are in release position in Fig. 6 and quick service application position in Fig. 7.

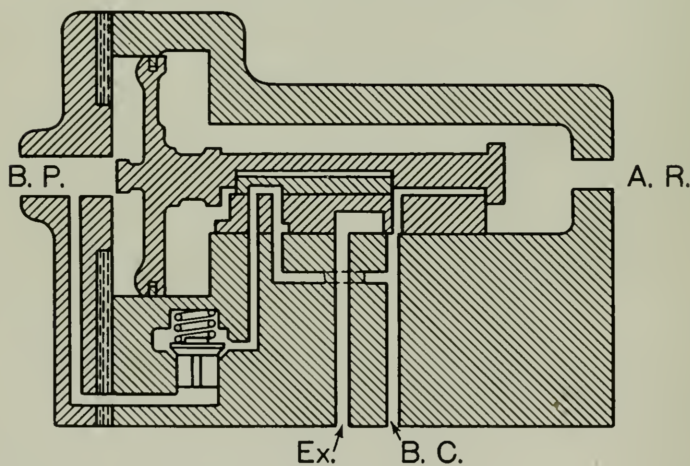
It will be noted that the piston and graduating valve must move to close the feed groove and that the piston must move the main slide valve to initiate quick service and open the service port. The quick service action at each "K" triple valve must wait for sufficient brake pipe reduction to overcome the main slide valve friction.

The data of Fig. 2 taken from more than 800 "K" triple valves in service shows that the required reduction will vary through wide limits. This delay in starting quick service at each valve greatly retards the serial propagation of service application, especially in long trains made up of modern cars which have a large brake pipe volume.

The opening of the "K" triple valve service and quick service ports are proportioned from the start to full open position of the slide valve so that there is no position of the slide valve where the brake pipe pressure can reduce faster than the auxiliary reservoir pressure. Otherwise this form of quick service would be unstable.

The proportioning of these port areas is based on minimum volume per car and maximum leakage of the brake pipe. Under

FIG. 7 - "K" TRIPLE VALVE
QUICK SERVICE POSITION



these conditions the vigor and effectiveness of the quick service as a means for propagating the service brake action through a long train is a maximum. The modern trend towards both larger volume and less leakage in the brake pipe has so reduced the effectiveness of "K" equipment quick service that a full service application sometimes fails to propagate beyond the middle of a long train of modern cars.

Figures 8, 9 and 10 are simple diagrams of a triple valve in release position designed to show graphically the force which must act to move a triple valve from release to application position.

Figure 8 indicates the condition when the brake pipe and auxiliary reservoirs are charged to 70 pounds pressure.

Figure 9 shows the brake pipe pressure reduced 1½ pounds below the auxiliary reservoir pressure. The "K" triple valve is designed to apply on this differential when its slide valve friction is normal. However the data of Figure 2 proves that many valves in service exceed this value for slide valve friction with the result

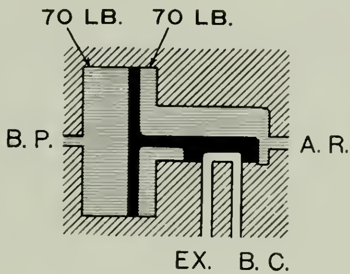


FIG. 8

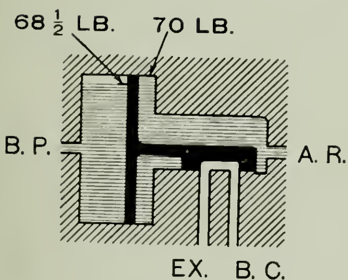


FIG. 9

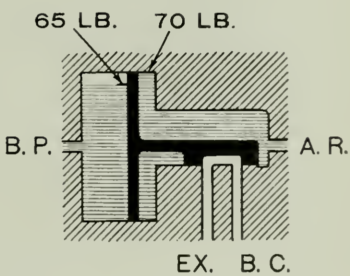


FIG. 10

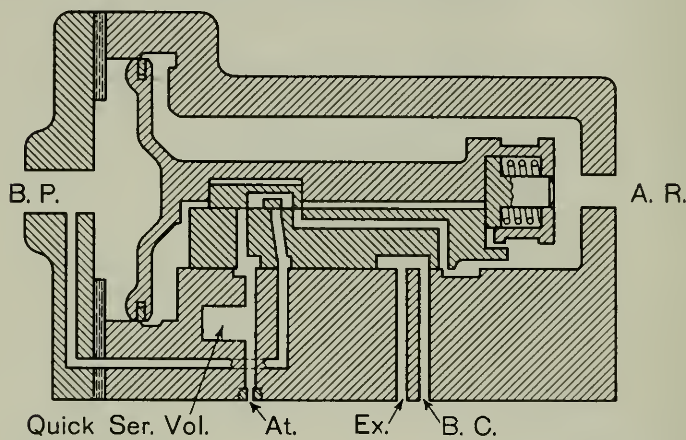
that they will not apply when the brake pipe pressure is reduced 1½ pounds.

Figure 10 shows the condition when a triple valve happens to have a friction near the maximum and the brake pipe pressure must be reduced 5 pounds below the auxiliary reservoir pressure before the brake will apply. The time required to accomplish the reduction necessary to apply such high friction triple valves is a direct delay to the propagation of the service application.

"AB" Equipment

The quick service control employed in the "AB" equipment in order to accomplish reliable and satisfactory propagation of service application under the difficult condition imposed by long trains of modern cars is illustrated by the simple diagrams of Figures 11, 12 and 13. These diagrams can be compared with Figures 6 and 7, which show the same valve parts for the type "K" brake equipment.

FIG. 11 - "AB" SERVICE PORTION
FEED GROOVE CLOSED



The parts of the "AB" service portion shown in the diagram of Figure 12 are in release position and in Figure 11 the parts are shown in the position where the piston and graduating valve have moved toward application to bring the spring stop in the piston stem against the main slide valve. This movement has closed the feed groove with the quick service port about to open and is accomplished by a very small pressure differential because it is only necessary to overcome the piston and small graduating valve friction. The effect of this friction is reduced by the increased diameter of the "AB" piston.

It will be noted that in order to initiate quick service (see Fig. 13) the piston differential must increase sufficiently to overcome the spring in the piston stem. The resistance of this spring is a dependably constant value which provides the necessary stability against undesired brake applications that might otherwise be caused by unavoidable minor variations of the brake pipe pressure.

The differential necessary to initiate the service application is determined by piston and graduating valve friction plus the fixed spring resistance. The spring resistance is a relatively large portion of the total resistance so that the unavoidable variation of

FIG. 12 - "AB" SERVICE PORTION
RELEASE POSITION

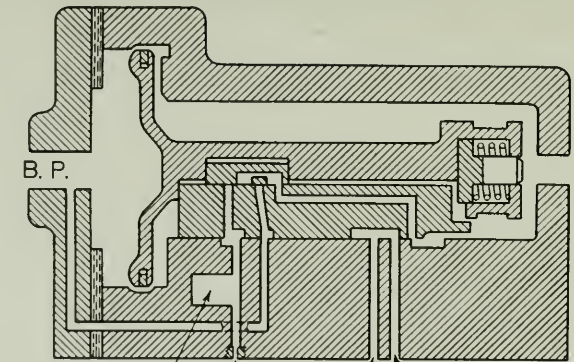
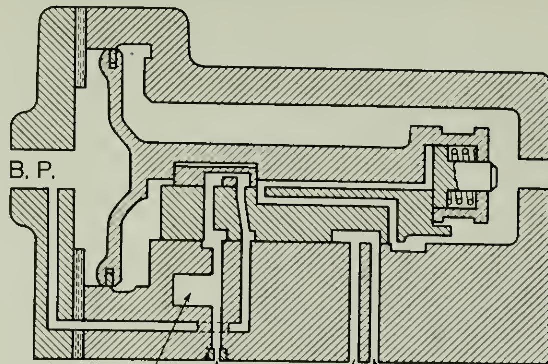


FIG. 13 - "AB" SERVICE PORTION
FIRST STAGE QUICK SERVICE



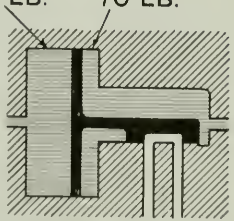


FIG. 14

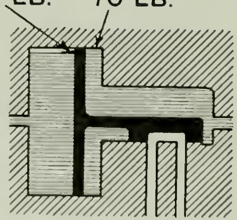


FIG. 15

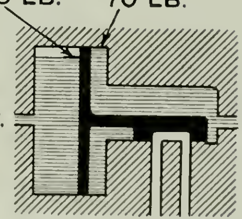


FIG. 16

graduating valve friction has a comparatively slight influence on the differential of pressure required to apply the valve, and therefore the valve can be and is adjusted to apply with a smaller differential without danger of instability against undesired applications. This stabilized increased application sensitivity is an important factor in the greater dependability and speed of service application propagation as accomplished by the "AB" as compared with the "K" equipment.

When the "AB" piston and graduating valve have moved to the position shown in Figure 13 the graduating valve connects the brake pipe to the quick service volume. The size of this connection is such that the brake pipe pressure will equalize into the volume so as to make a rapid local reduction of brake pipe pressure sufficient to insure the prompt movement of adjacent valves and, therefore, all valves in the train, to this quick service position. The filling of the quick service volume is designated as the first stage of the "AB" quick service.

The second stage of the quick service action, which initiates the application of the brakes, is the somewhat slower venting of the brake pipe pressure to atmosphere through the calibrated orifice which connects the quick service volume to atmosphere. This stage of quick service continues until sufficient pressure differential builds up on the piston to move the main slide valve.

The Figures 14, 15 and 16 are simple triple valve diagrams which show graphically the action of pressure when the brake application is initiated. Figure 14 shows the brakes released with the auxiliary reservoir and brake pipe pressure charged to 70 lbs.

Figure 15 shows the brake pipe pressure reduced one pound below the auxiliary reservoir. The "AB" equipment piston and graduating valve will move to initiate the quick service with this reduction because the combined friction and spring resistance will range between .7 and .9 lbs. pressure differential on the piston.

Figure 16 represents the condition of pressure at the end of the second stage of quick service when the brake pipe pressure is brought 5 lbs. below the auxiliary reservoir pressure as may occur ocassionally on account of high main slide valve friction. The main slide valve of the "AB" valve is designed to have an average application resistance of 1½ lbs. and unless its frictional resistance is abnormal it will move to application position with this amount of brake pipe reduction.

In case any valve should develop main slide valve friction exceeding 1½ lbs. it cannot influence the propagation of quick service and the second stage of quick service action will continue the local reduction until the slide valve does move. Excessive resistance to slide valve movement is prevented from materially delaying the application of the individual brake because at this time other brakes which have applied are discharging brake pipe air to their brake cylinders and must continue to do so until the brake pipe reduction exceeds 5 lbs.

When the slide valve moves the second stage of quick service is cut off, the auxiliary reservoir is connected to the brake cylinder and the brake pipe is connected to the brake cylinder through the modifying valve for the third stage of quick service as shown on Figure 17. This stage of quick service continues to reduce the brake pipe pressure at a controlled rate until the modifying valve closes automatically when the brake cylinder pressure rises to a value of about 10 pounds. The third stage of quick service is inactive at all brake cylinder pressures above 10 lbs. which means that it is cut out when cycling on a grade with retaining valves cut in.

This feature guarantees a prompt and effective cylinder pressure for the first brake application on a grade and provides for greater flexibility of control during the subsequent applications made while cycling. With the third stage of quick service completely cut out by retained brake cylinder pressure acting on the modifying valve it is possible to re-apply the brake with smaller increments of cylinder pressure and in many cases this will avoid stalling the train, or undesired early release of the brakes to avoid stalling.

The flow of brake pipe air to atmosphere during the second stage and to the brake cylinder during the third stage of quick service is controlled at a rate which serves to absorb any pressure surges induced in the brake pipe by the rapid action of the first stage of quick service. Unless properly dampened or absorbed surges or pressure waves in the brake pipe may cause the undesired release of brakes. The rapid action of the first stage of quick service is essential to the accomplishment of a fast propagation of the service brake application through a long train.

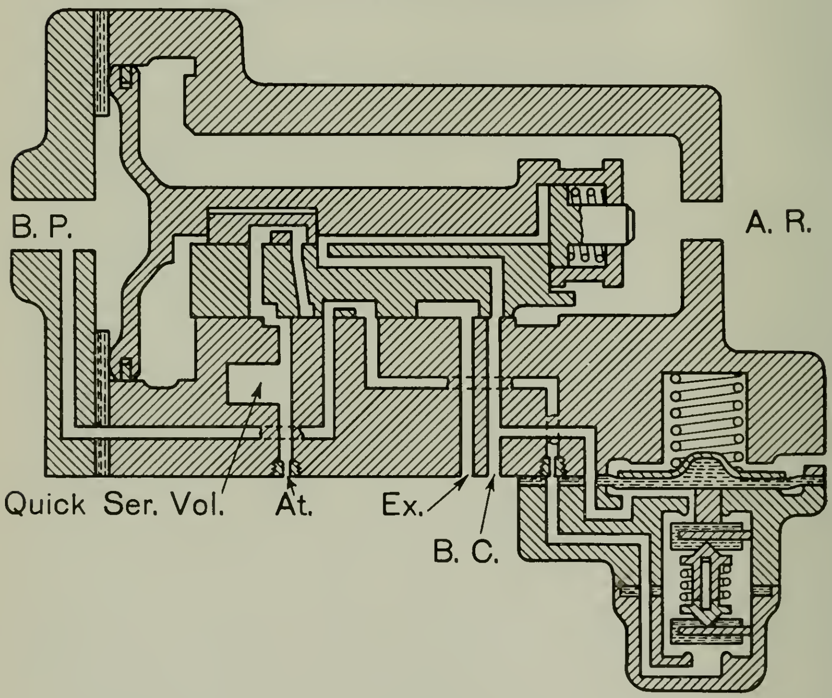
Service Application Propagation Speed

The speed of brake action propagation is determined by dividing the total length of the train brake pipe by the time which elapsed from the first movement of the first brake to the application of the last train brake. This speed is expressed as feet per second along the brake pipe. A high rate of propagation is desirable because it is an important factor in the control of train slack so as to avoid objectionable shocks.

The diagrams of Figure 18 are a graphic comparison of service application propagation speed through a 150 car train, with minimum and maximum brake pipe leakage, for the "K" and the "AB" brake equipments.

FIG. 17 - "AB" SERVICE PORTION WITH LIMITING VALVE

THIRD STAGE QUICK SERVICE



It will be noted that the brake pipe leakage condition has a very decided influence on the service propagation speed of the "K" equipment which increases from minimum to maximum more than 125%. The performance of the "AB" equipment under the same conditions only varies to a minor degree, about 15%. The variation of propagation speed with leakage is a direct interference with the reliability and flexibility of the brake control and this comparison represents an important degree of improvement in favor of the "AB" brake equipment.

The value of propagation speed for the "K" equipment at minimum leakage is given as about 95 feet per second. This does not tell the whole story because in long trains of "K" equipment and with a minimum leakage a full service reduction at the brake valve will fail to propagate beyond the middle of

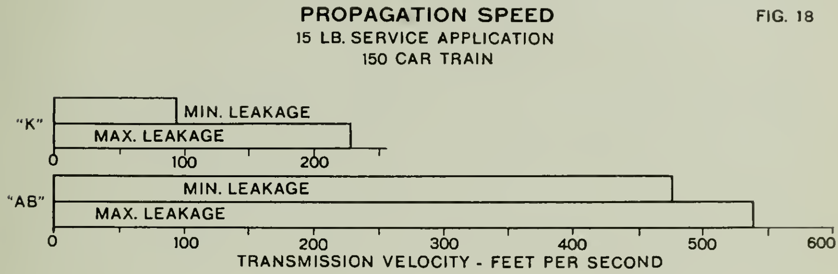


FIG. 18

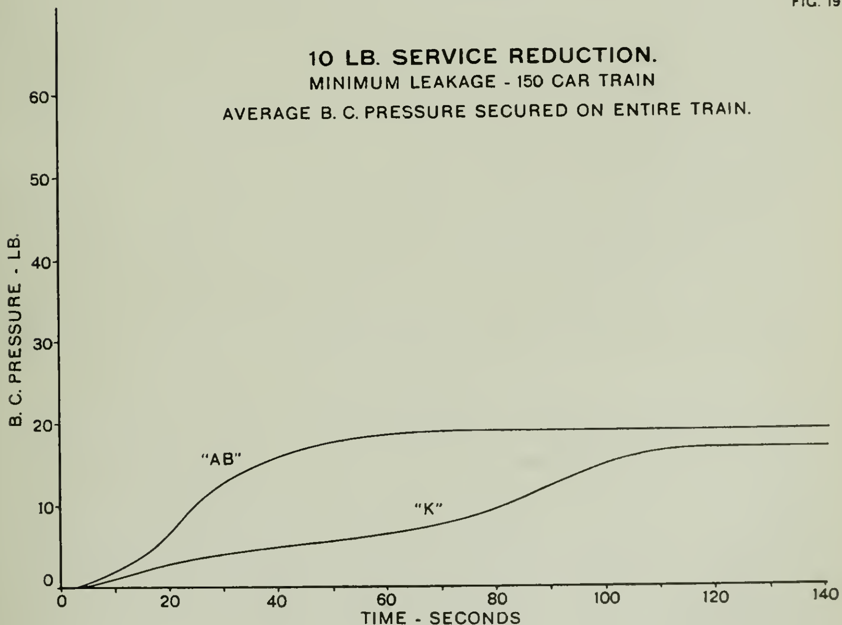


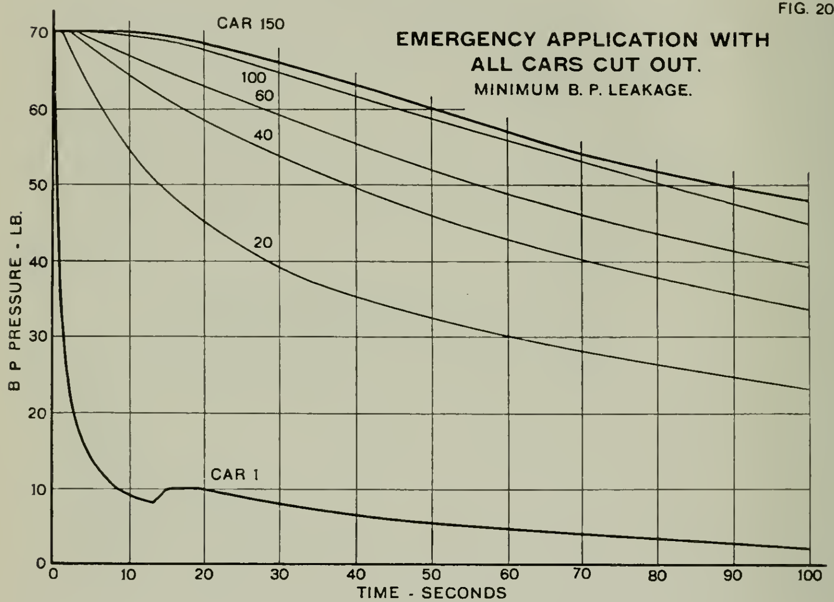
FIG. 19

the train unless all the triple valves are in much better than average service condition which was the case for the test from which the value was secured.

A direct comparison of the service propagation speeds shown in the diagram indicates that the speed of the "AB" equipment is from 150% to 395% better than the "K" equipment, this variation being chiefly in the variations in the operation of the "K" equipment. This improvement is a large factor in the better train control that has been demonstrated in the long train trials of "AB" versus "K" equipment.

The superior performance of the "AB" equipment in service application is shown in the diagram of Figure 19. This chart shows two curves, one for "AB" and the other for "K" equipment. The curves are the average value of brake cylinder pressure in all the cylinders of a 150 car train, plotted with respect to time from the instant of brake valve movement to service position. The area between the curves represents the time and pressure gain of the "AB" over the "K" equipment for a 10 pound service application. This gain explains the much shorter service application stops obtained during the road trials of the "AB" equipment.

FIG. 20



EMERGENCY APPLICATION OF TRAIN BRAKES

The curves of Figure 20 are plotted on a time base and show the change in brake pipe pressure at 6 locations in a 150 car train when an emergency application is made at the engine brake valve with all the car brakes cut out. Under this condition there is no local venting of the brake pipe pressure at the cars and all the air discharged from the brake pipe must pass to atmosphere through the large emergency port of the brake valve and the engine vent valve.

These curves illustrate how slowly the reduction of brake pipe pressure is accomplished at the various locations towards the rear of the train and this in turn indicates that in order to effect a rapid propagation of the brake action means must be provided for venting the brake pipe locally at each car. This principle is embodied in both the service and emergency application functions of the "AB" equipment in a manner which makes these functions very much more effective and reliable in long train service than the same functions of the "K" equipment.

The emergency application of the "AB" brake equipment is propagated by venting brake pipe pressure to atmosphere through a quick opening large area valve at each car. The controlling mechanism is designed to afford the maximum speed of propagation and this speed is substantially constant through a range of 30 to 90 pounds brake pipe pressure.

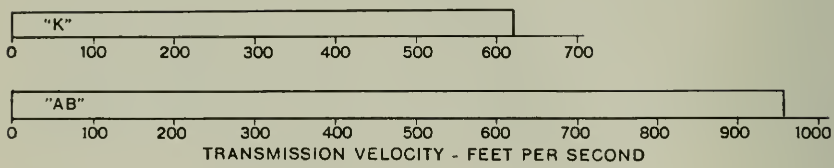
Figure 21 is a diagram which compares the emergency application propagation speed of the "K" and "AB" equipments. The values shown were determined from 150 car train tests. It will be noted that the speed is about 620 feet per second for the "K" and 960 feet per second or a 55% gain for the "AB" equipment. This improvement is an important factor in the satisfactory control of slack in long trains during an emergency brake application.

An important feature of the "AB" equipment design is the ability to obtain an emergency application following any degree of service application. Under such a condition the emergency application can be propagated at normal speed and the maximum emergency cylinder pressure which is 20% greater than the full service cylinder pressure, will be developed. When as much as a 10 pound service reduction is made with the "K" equipment the emergency action will not function and it is only possible to develop normal full service cylinder pressure at a rate which is dependent on the rate at which the brake pipe can be reduced through the brake valve.

Figure 22 is a diagram which gives a comparison in the effectiveness of both the "AB" and "K" equipments for an emergency following a 10 pound service brake application on

PROPAGATION SPEED
EMERGENCY APPLICATION
150 CAR TRAIN

FIG. 21



a 150 car car train. The curves show the average brake cylinder pressure of all the cars in the train plotted on a basis so that the area between the curve represents the pressure time gain of the "AB" over the "K" equipment. Road tests of this feature demonstrated not only shorter stops but also a much safer and more satisfactory control of the train slack.

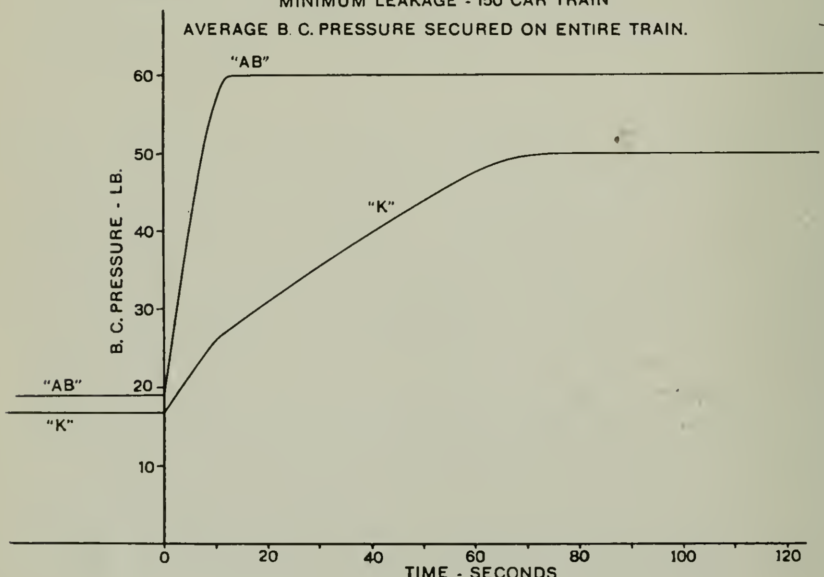
RELEASE AFTER SERVICE APPLICATION

"K" Equipment

The problem of raising the brake pipe pressure so as to effect a prompt and dependable release of all brakes in a long train is well illustrated by the curves of Figure 23. The six

FIG. 22

EMERGENCY APPLICATION AFTER 10 LB. REDUCTION
MINIMUM LEAKAGE - 150 CAR TRAIN



solid line curves shown in this chart give the value of the brake pipe pressure for six locations in the train with respect to time after the brake valve is moved to release and running positions with the brake pipe charged to 50 lbs. and all brakes cut out. When making this test the brake valve was first moved to full release position for a time of 15 seconds and then placed in running position for the remaining time of the test.

In other words, these curves are a record of the rise in pressure when all the air supplied by the brake valve is used to raise the pressure of the brake pipe volume only. It will be recalled that the "AB" brake does not take air from the brake pipe to the auxiliary reservoir until the brake pipe pressure rise exceeds that required to accomplish brake release and, therefore, the most critical rate of brake pipe pressure rise with "AB" brake is approximately that shown by the solid lines.

The broken line given the brake pipe pressure values at car 150 for an identical test except in this case a "K" brake equipment was cut in on each car. A comparison of this line with the solid line marked car 150 shows in the lower pressure zone the effect of triple valves releasing and charging during release, on the rate of rise near the rear car. Any leakage rate greater than the minimum of these tests would further decrease these rates of brake pipe pressure rise.

Comparing the solid and broken lines for the car 150 location it will be noted that 12 and 15 seconds respectively must elapse before any increase of brake pipe pressure is evident. When a time of 90 seconds has elapsed the brake pipe pressure shown by the solid line has increased to 66 lbs. and for the broken line to 53 lbs. The average rate of rise at the rear car is about 11 lbs. per minute with the brakes cut out and falls to 2 lbs. per minute when the brakes are cut in.

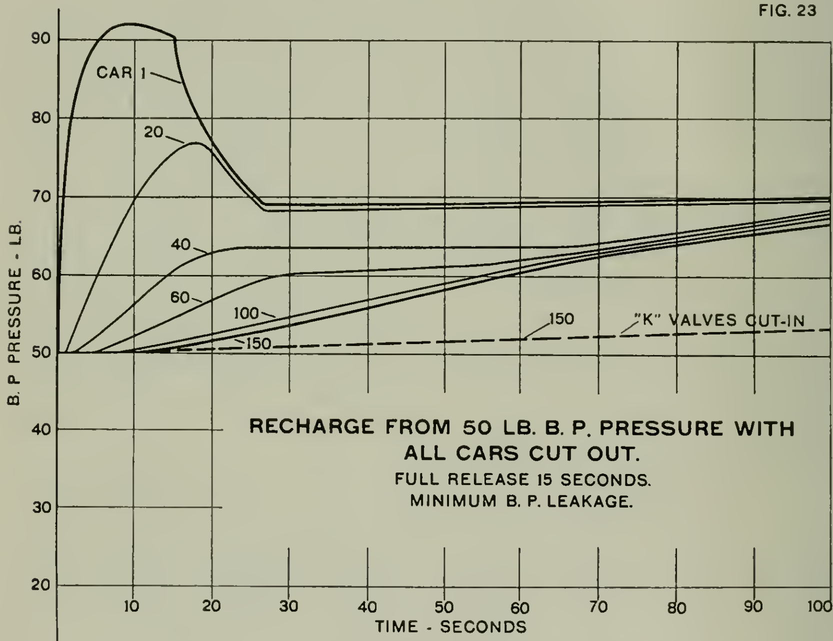
The latter rate of rise not only extends the time required to release but it often causes release failures of triple valves which may happen to have higher than normal release resistance combined with sufficient ring leakage to permit the auxiliary reservoir to recharge and thus prevent the development of a sufficient pressure differential on the piston to move the slide valve to release position.

The tests represent the conditions for releasing after a full service reduction of 20 lbs. from the standard brake pressure of 70 lbs. When releasing after brake pipe reductions smaller than 20 lbs. the pressure increase rate will be much slower and the danger of release failures near the rear end of the train will be correspondingly increased.

The release effectiveness of the faster rate of rise with "AB" Equipment is especially important in the early stage of release, as illustrated on Figure 23.

Figure 24 is a diagram of the "K" triple valve in the service lap position which this valve assumes at the time a release of

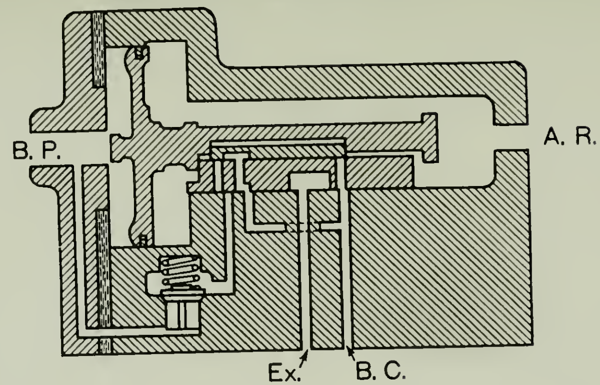
FIG. 23



the train brakes is started. It will be noted that the piston stem is in contact with the main slide valve, and that the brake cannot release until the brake pipe pressure rises high enough to enable the piston to overcome the slide valve frictional resistance.

The variation of slide valve friction extends over a wide range and is unavoidable. The "K" triple valve is designed to have a normal slide valve release resistance equivalent to a 1½ lbs. pressure difference on the two sides of the piston. It is not possible to change the design so as to lower this value of normal resistance because then many valves would be unstable and give undesired release when their slide valve happened to have a resistance near the minimum.

FIG. 24 - "K" TRIPLE VALVE
SERVICE LAP POSITION



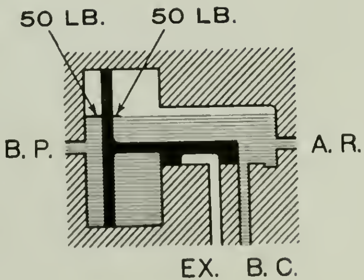


FIG. 25

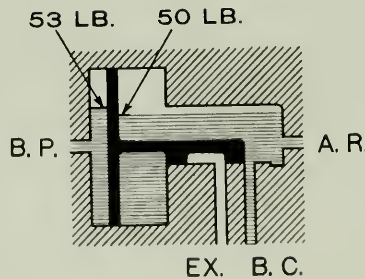


FIG. 26

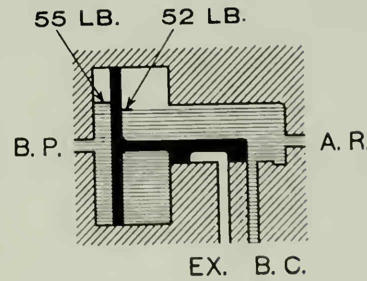


FIG. 27

The diagram of Figure 3 is a graphic record of the data secured when more than 800 triple valves chosen at random were removed from service and tested to measure their release resistance. It will be noted that a large majority of the valves had a resistance higher than the 1½ lb. normal value and that the range of variation extended from a minimum of 1 lb to a maximum of 5½ lbs.

The simple diagrams of Figures 25, 26 and 27 are a graphic representation of the brake pipe and auxiliary reservoir pressure changes during release of "K" brake equipment near the rear end of a long train.

The diagram of Figure 25 shows the brake fully applied with the pressure equalized at 50 lbs.

Figure 26 shows the brake pipe pressure increased 3 lbs. above the auxiliary reservoir pressure during release. The release of the valve will depend on the release resistance of its slide valve. The data of Figure 5 indicates that a considerable percentage of "K" valves in service will have a resistance of 3 lbs. or higher and as the brake pipe pressure rises at a very slow rate a high pressure differential will act on the piston for a long time.

If the triple valve piston packing ring leaks the condition shown in Figure 27 may develop where leakage permits the auxiliary reservoir pressure to build up with the slowly rising brake pipe pressure. When this condition develops a release failure of the brake results. The inherent variation of "K" slide valve release resistance over a wide range is a vital limitation of "K" brake equipment performance in modern long trains.

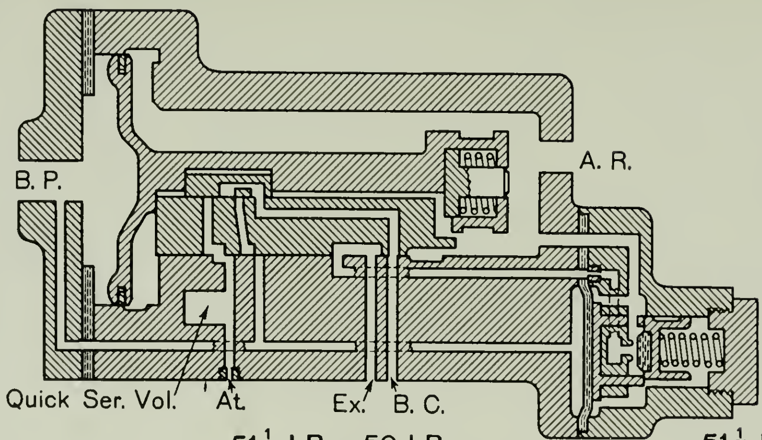
"AB" Equipment

The diagram of Figure 28 shows the means provided in the "AB" equipment which eliminates the effect of the wide variation of the slide valve release resistance. The "AB" slide valve frictional resistance variation does not differ widely from that of the "K" triple valve but the release insuring feature of the "AB" valve operates to effect the release of the brake by local venting of the auxiliary reservoir whenever the slide valve friction happens to be 1½ lbs. or more. The mechanism of the release insuring feature is shown at the right side of the diagram.

This mechanism has a diaphragm that is exposed to brake pipe pressure on one side and auxiliary reservoir pressure on the other side. The diaphragm is arranged so that when the brake pipe pressure rises 1½ lbs. above the auxiliary pressure it can move to the

FIG. 28 - "AB" SERVICE PORTION WITH RELEASE INSURING

SERVICE LAP POSITION



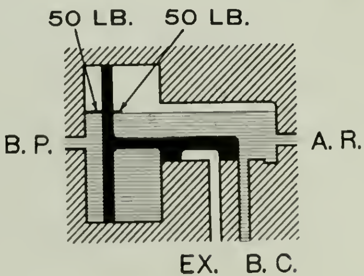


FIG. 29

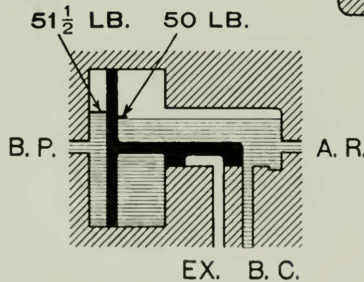


FIG. 30

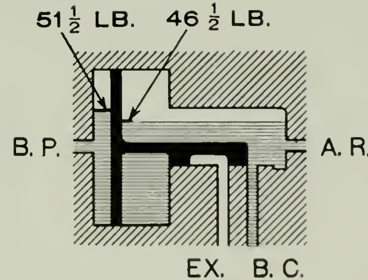


FIG. 31

right and push a valve open against a fixed spring resistance which normally holds the valve to its seat. The valve controls a port which leads from the auxiliary reservoir to atmosphere through the slide valve when the slide valve is in the service lap position.

During release, if any slide valve happens to have more than normal release resistance, as soon as the brake pipe pressure is increased 1½ lbs. above the auxiliary reservoir the release insuring valve opens and vents the reservoir to atmosphere until the increasing pressure differential is able to move the slide valve to release position when this atmospheric port is cut off by the slide valve. All valves which have a resistance of less than 1½ lbs. release promptly without the operation of this feature. In any case the automatic venting of the auxiliary is the exact amount necessary to release each individual brake.

The pressure conditions which would be involved in the release of a valve that happened to have a maximum release resistance of 5 lbs. is shown graphically by Figures 29, 30 and 31.

Extensive brake trials have proved that this feature will insure prompt and positive release of all the brakes in a long train. The effect of ring leakage on release reliability is greatly reduced because the ring is never subject to a pressure differential higher than 1½ lbs. except while the auxiliary reservoir pressure is being reduced by the release insuring valve at a rate too rapid to be affected by ring leakage.

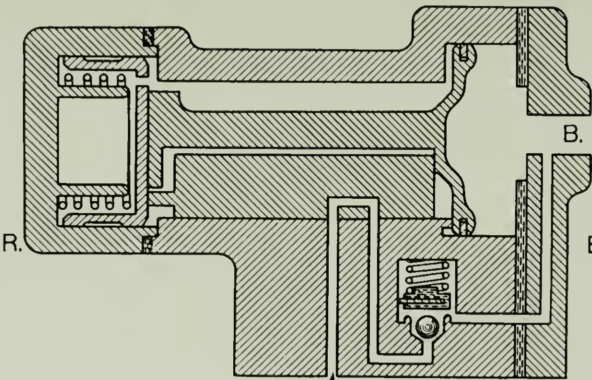
The diagram of Figure 32 shows the ports and check valve in the "AB" emergency portion which provide the feature of accelerated release after emergency.

At the start of release after emergency the brake pipe pressure is zero or atmosphere and the two reservoirs and the brake cylinder are equalized at 60 lbs. as shown in the simple diagram of Figure 33.

When the brake pipe pressure is built up to a value of about 20 lbs. the emergency piston and slide valve move to their release position shown in Figure 32. This movement of the emergency slide valve isolates the emergency reservoir and connects the combined volume of the brake cylinder and auxiliary reservoir to the brake pipe as shown.

The simple diagram of Figure 34 shows the pressure conditions at the service portion piston when the emergency portion moves to release as described.

FIG. 32 - "AB" EMERGENCY PORTION
ACCELERATED RELEASE AFTER EMERGENCY



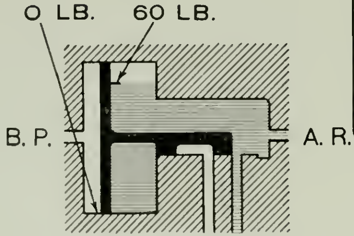


FIG. 33

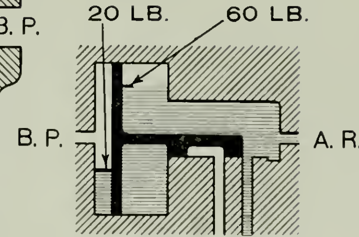


FIG. 34

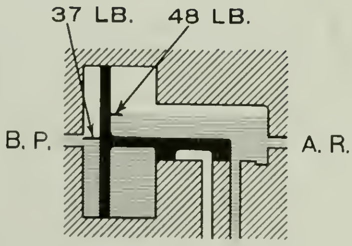


FIG. 35

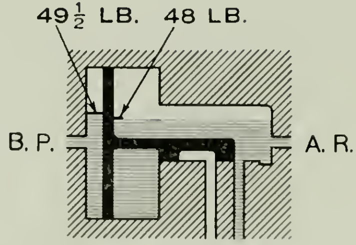


FIG. 36

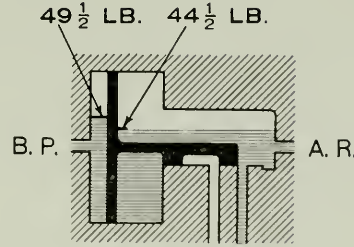
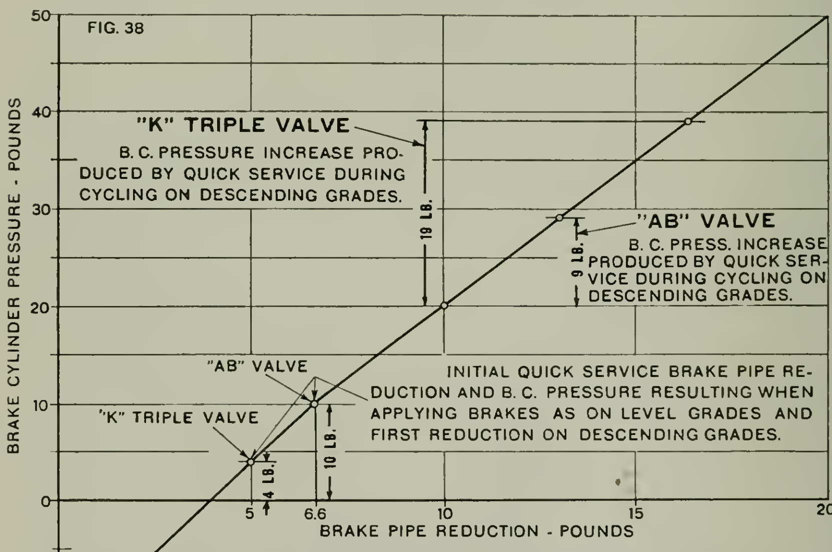


FIG. 37

The diagram of Figure 35 illustrates the pressure changes from those shown in Figure 34 which are quickly accomplished by the flow of auxiliary reservoir and brake cylinder pressure to the brake pipe. It will be noted that the brake pipe pressure rises quickly from 20 to 37 lbs. and the auxiliary reservoir pressure reduces from 60 to 48 lbs. which is about the same value as would be encountered when releasing after a full service application.

When the brake pipe pressure is raised from 37 to 49½ lbs. as shown in Figure 36, the 1½ lbs. release differential is sufficient to open the release insuring feature and the valve is released promptly. The reduction of auxiliary reservoir pressure by the action of the release insuring feature, in case of high slide valve friction, is shown graphically in Figure 37.



BASIC BRAKE PIPE REDUCTIONS AND BRAKE CYLINDER PRESSURES PRODUCED BY QUICK SERVICE ACTION OF "K" AND "AB" TRIPLE VALVES.

The line plotted on Figure 38 shows the brake cylinder pressure developed for various brake pipe reductions for both the "K" and "AB" brake equipments.

The quick service action is controlled in the "K" triple valve so the least stable brake pipe reduction that can be made is about 5 lbs. and this will produce a brake cylinder pressure of 4 lbs. gage or 19 lbs. absolute pressure.

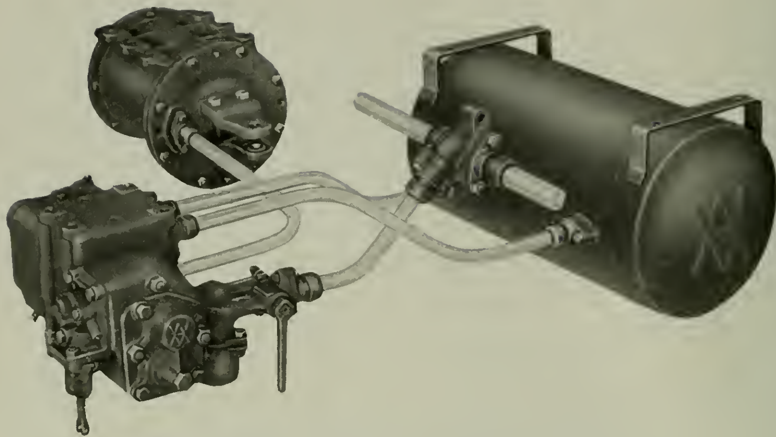
The minimum of 4 lbs. cylinder pressure is of negligible train retardation value because this pressure is not sufficient to overcome brake cylinder and rigging resistance and produce retarding force. The "AB" equipment is stabilized so that the minimum cylinder pressure for an initial reduction will be 9 to 10 lbs. gage and the initial brake pipe reduction will be about 6.6 lbs. This value of cylinder pressure produces a measure of effective retarding force which is very necessary at the beginning of all service applications including the initial brake pipe reduction made to secure control of a train as it starts down a grade.

With the "AB" equipment after the cylinder pressure is built up to 10 lbs. or lighter, the third stage of quick service action is cut out by the modifying valve and for any subsequent reductions the least stable reduction will increase the cylinder pressure only 9 lbs.

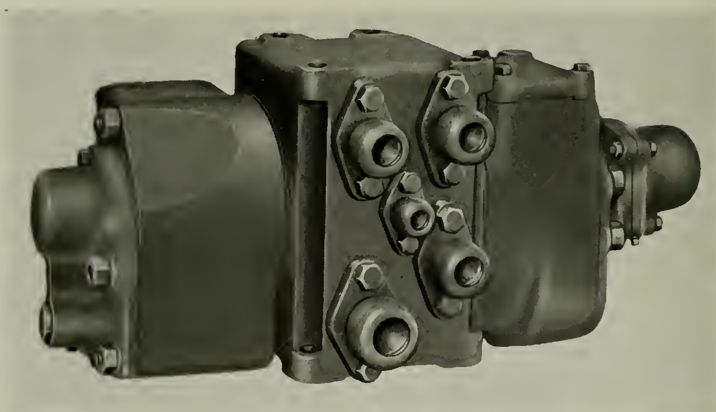
The "K" equipment quick service is not modified by cylinder pressure and as the least stable reduction is 5 lbs., the subsequent reduction increases the cylinder pressure 19 lbs.

Assuming that 20 lbs. retaining valves are used the curve of Figure 38 illustrates how, during brake cycles, the least amount the brake cylinder pressure can be increased is 19 lbs. with the "K" and 9 lbs. with the "AB" equipment.

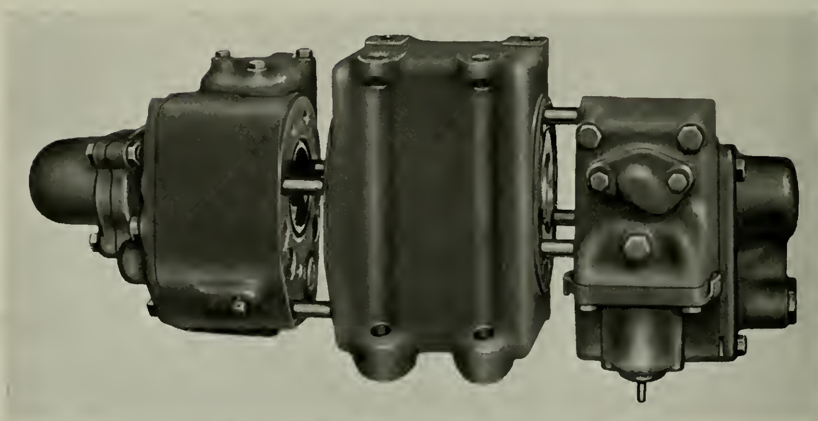
The smaller minimum increase of brake cylinder pressure available with the "AB" equipment is an important gain in the flexibility of train control when cycling on a grade. This added flexibility will make it possible to hold a train on a grade at a much more uniform speed. It also increases the margin of reserve braking power and effects economy in the use of compressed air.



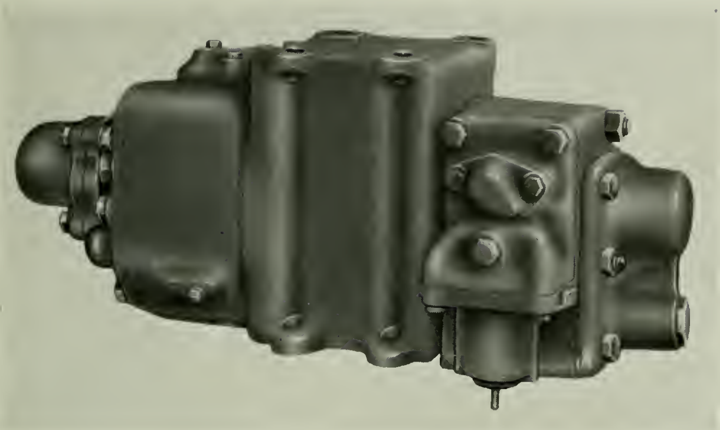
"AB" FREIGHT BRAKE—EQUIPMENT ASSEMBLY



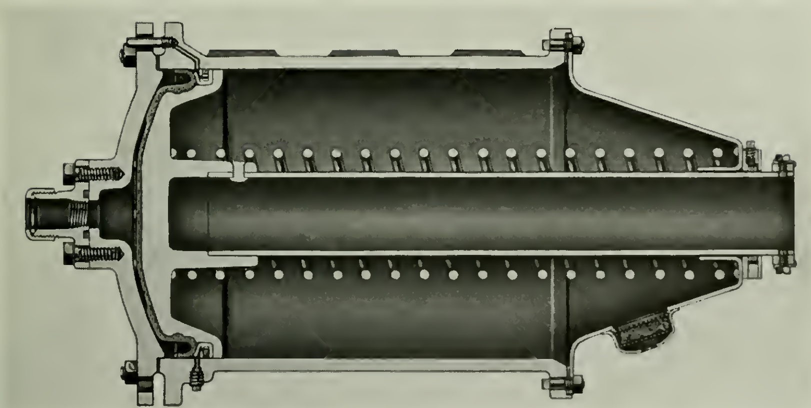
"AB" VALVE—PIPE BRACKET FACE



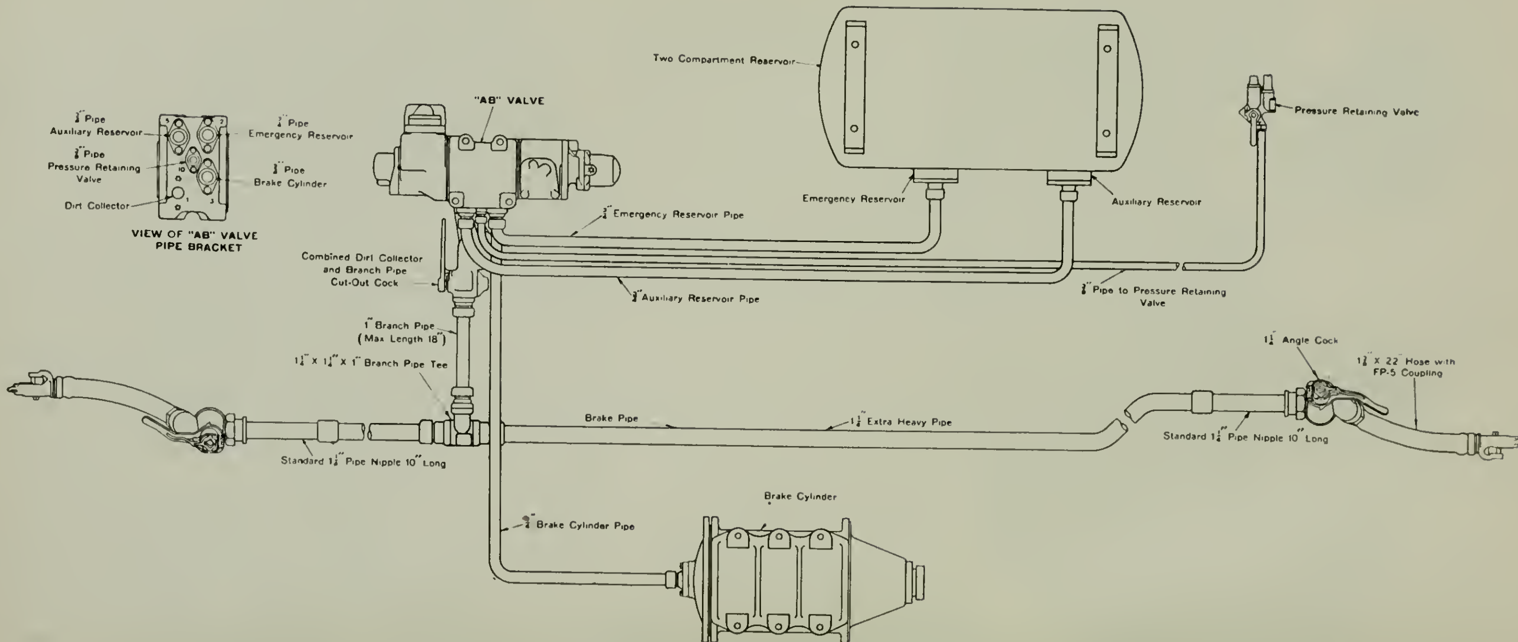
"AB" VALVE—OPERATING PARTS AND PIPE BRACKET



"AB" VALVE—FRONT VIEW



THE IMPROVED FREIGHT BRAKE CYLINDER



"AB" BRAKE EQUIPMENT—PIPING DIAGRAM

PRESIDENT: The "AB" Brake being a new development in railroad operation, the paper tonight should provoke a lot of discussion. I believe that Mr. Farmer knows more about this brake than any other man, and as he is willing to answer any questions I hope the members will take the opportunity to find out more about this brake.

I understand that the study relating to this brake was made out at Purdue University and since we have a Purdue man in the audience I would like to get his reaction to the paper. Professor Endsley.

PROF. L. E. ENDSLEY: I came from Purdue away back long before these brakes were tested out there. I have very much enjoyed Mr. Farmer's description of the new brake for railroad freight cars. It has been very clear indeed to me. I have followed what they have been doing from the surface only but I have not gotten into all the phases of it. Mr. Farmer has surely given to all of you who are familiar with the "K" triple the advantages which the "AB" brake has over the "K". Of course the "K" was developed for the needs of some time ago; the "AB" was developed for the needs of today. I imagine in another twenty years if Mr. Farmer still lives he will be back here with something better than the "AB". But I am sure we have all enjoyed this very clear description of what the new brake is doing and I am proud to live in the city with the Westinghouse Air Brake Company that through Mr. Farmer and his assistants is doing so much for the new equipment for the American railways. Any one who has studied the subject will know at once that there will be a big saving in operating costs, not only a saving in handling trains but a saving in damage to freight, a saving which I do not believe any one can measure in dollars and cents but which we all know must be very considerable.

PRESIDENT: Professor Endsley told you something about his dream of the future. We have with us a man who has had considerable to do with brakes, Mr. Crawford, and I will ask him to tell us what he thinks of the present development of the air brake.

MR. D. F. CRAWFORD: Mr. President and Gentlemen: My acquaintance with the air brake commenced when the three-way valve on the locomotive operated the straight air brake on passenger trains. After this various air brake devices followed, designated by many letters of the alphabet. I remember the "H" and "K" triple valves for freight cars, and the "ET" locomotive appliances, as well as the "L" and "UC" for passenger train service. The "AB" having been born since my departure from the railway service, I asked for a copy of Mr. Farmer's paper, so that, I might become acquainted with this new member of the air brake family, with this privilege, I made some memoranda of my impressions, which, if I may be permitted, I will read.

First. The splendid example of what can be done when the "Will to do it" exists.

Second. By the approach to, and the solution of the problem presented. A condition prevailed which required attention. It was met, by realization and study of the situation, and solved step by step by the application of knowledge, and keen engineering sense, without propaganda. The perfection of the achievement indicates in itself, that there was little room for determination by trial and error

In other words, Mr. Farmer and his associates, knew what they wanted, and how to get it. An unsual situation in these jumpy days.

Third. The results obtained, as portrayed to us show clearly the advantage of joint consideration of any apparatus by both the user and producer, as both the Air Brake Company and the railways contributed their knowledge, experience and limitations.

The railways, and indeed, their patrons, the people are to be congratulated for the policy of the Westinghouse Air Brake Company to continually develop braking appliances to meet every real demand. In my own experience of many years, I found the officers of the company eager to obtain the facts, and to use them for the benefit of all concerned.

I am sure that we all agree that the Air Brake Company has provided braking apparatus, from time to time, that has permitted the railways, to increase the capacity of locomotives and cars, and to increase the speed of trains, thus assisting in providing in the United States the lowest cost railway transportation in the world.

In the last ten years alone. The average capacity of freight cars has increased 4.14 tons or 9.5%. The average tractive force of locomotives, increased 7,950 pounds or 20.5% and the average speed of freight trains has increased from 10.9 mph.

to 15.8 mph. or 44.8%. The tons per loaded car of the "Product of Mines" (the heaviest lading) has risen from 41.9 tons to 51.5 tons or 5%. This data alone is in, my opinion, sufficient to justify all of the effort and all of the skill that has been brought to bear, to produce the efficient appliance, so excellently presented to us this evening.

It has been a privilege for me to hear the paper, as I am still deeply interested in everything having to do with transportation.

PRESIDENT: We have heard from a mechanical man and a practical man and now we will hear from a salesman, Mr. S. G. Down.

MR. S. G. DOWN: Mr. President and Members of the Railway Club of Pittsburgh: I appreciate the compliment your President paid to me and the privilege of speaking to you on the subject before us. I am quite sure we all agree that Mr. Farmer has covered this subject in a very complete manner, leaving very little to be said, but this is as we might expect for you know Mr. Farmer is the daddy of the "AB" brake and naturally a parent is well qualified to describe his own child.

You will recall Mr. Farmer's reference to the American Railway Association tests conducted on the Siskiyou Mountain of the Southern Pacific Railway. It was during these tests that the fundamentals of the present "AB" brake were checked and it occurred to me that this is of particular interest in view of the fact that Mr. Farmer started his railroad career in the Southern Pacific Railway and particularly on the Siskiyou grade. I am sure that little did he anticipate when working on the S.P. some 40 years ago he would ever go back as the daddy of the Air Brake that now solves the great freight transportation problem.

It further seems quite fitting that he should present a paper on this great development in the Air Brake art in the city of Pittsburgh because Pittsburgh is the home of the Air Brake. It was on the Pennsylvania Railroad that the first Air Brake was installed by Mr. George Westinghouse and all practical developments since that early installation have been tested in practical service in this vicinity. In other words, the Pennsylvania Railroad has been more or less the testing ground, and it is particularly interesting to know that the Pennsylvania Railroad was the first to apply "AB" brakes to their freight cars.

Mr. Farmer outlined a number of the characteristics of the "AB" brake which had to do with the elimination of time in both application and release. When you look over the history of the Air Brake, it will be obvious that the elimination of time is the thing sought by the engineers all these years and this modern development is nothing more nor less than history repeating itself.

Some of you will recall the American Railway Association tests on the Chicago, Burlington & Quincy Railroad 48 years ago. At that time, a train of 50 cars was a very long one, and it was found that due to the slack action in trains, very rough stops were being made.

The investigation to overcome this situation led up to the Burlington tests in 1886, at which time various forms of brakes were submitted and tested and all failed to accomplish the desired result. In 1887, tests were continued and at that time George Westinghouse had developed and submitted the quick action brake which was tested in competition with other forms, particularly the electrically actuated pneumatic brake. This latter equipment controlled the slack action very satisfactorily but owing to electrical difficulties, it was discarded in favor of the Westinghouse quick action device which not only provided for proper slack control but was very stable in its action and this quick action feature has remained as standard in all these years.

As modern freight trains have increased in length to 150 cars, it requires apparatus operating on the shorter rate of propagation time in both service and emergency application and Mr. Farmer showed you on the screen tonight charts where quick action propagation time of the "K" triple valve was around 600 ft. per second whereas with the "AB" equipment it is 960 ft. This is a marked increase and is sufficient with the modern method of controlling the flow of air into the brake cylinders during the time the emergency action is being obtained so that the slack movement on 150 cars is well within safe limits.

It might be interesting to compare the quick action propagation time of two long trains—one equipped with "K" triple valves and the other with "AB" equipment, by assuming two freight trains reaching from the Union Station in Pittsburgh to Altoona—and the brakes applied in emergency on both trains at Pittsburgh at the same moment. When quick action had carried throughout the "AB" train and the brakes on the last car in the train at Altoona had applied, the brakes on the train equipped with "K" triple valves would be applying somewhere in the vicinity of Johnstown.

Many appreciating that the elimination of time is one of the vital factors in brake operation and slack control, the question might naturally arise—Why not equip cars with an electrically operated brake which, obviously, would eliminate time? This question has been given consideration and, in fact, numerous forms of electrically operated air brakes have been developed and tested in the laboratory but it has not been considered expedient to introduce them in American railway service for the reason that during the transition period, in changing from pure pneumatic to electro-pneumatic over two million cars would have to be changed and, on the basis of making this change at the rate of two hundred thousand cars per year, it would take ten years to complete the change. During this ten year period, no advantage would be obtained from the electric operation as it requires 100% of the cars in each train to be so equipped. However, it is fortunate that the "AB" brake is capable of meeting our modern-day conditions and completely harmonizes with the "K" triple valve because as soon as the "AB" brake is introduced in service, its action is not only an improvement over the old but it in turn contributes to better performance on the part of the "K". In other words, it not only does a good job for itself but helps the other unit and therefore railways applying the "AB" brake obtain a return on the investment as soon as it is placed in service.

An air brake device applied to American railway cars has more or less unusual combinations of conditions to contend with as it must not only operate successfully as a single unit but must do so collectively with all combinations of train make-up, changes in temperature, varying degree of maintenance, etc., whereas, most mechanical appliances are designed and built with one operating condition confronting you, i.e., successful performance as a single unit.

Following the successful check test of the "AB" brake made on the Pennsylvania Railroad by the A.R.A., the Chesapeake & Ohio Railway officials decided to equip 180 of their heavy coal cars with a view of testing out the equipment under the particular and practical operating conditions prevailing on that railway. When the cars were equipped, a schedule of road demonstrations was established and the first run consisted of a train of 150 empty cars which was moved from Russell, Ky., to Columbus, O. During this trip, at various points, the brakes were applied in what we term straight away emergency at 15 m.p.h. and straight away emergency at 30 m.p.h. Tests were also made with service applications in which the train was slowed down to approximately 15 m.p.h. after which the brakes were released and the train proceeded without stopping.

While running at 50 m.p.h., the train was brought to a smooth stop by opening the conductor's valve in the caboose and various other combinations of road conditions were tried out with very satisfactory results.

On the following days, the same demonstrations were made between Russell, Ky., and Columbus, O., with trains of 160 empty cars and 170 empty cars with similar results. Following the empty car demonstration, the cars were loaded with coal and the train of 155 loaded cars was subjected to the same tests as the previously mentioned empty car train with very satisfactory results.

The C. & O. Railway have an operating problem that is perhaps somewhat unusual as this is a North and South road and necessarily crosses all the lines running East and West. With the numerous grade crossings, in handling their long trains with the "K" triple valve, the train frequently must be slowed down while approaching such crossings. With the "K" equipment, it is necessary to stop in all cases after the brakes have been applied and the speed reduced in order to avoid break-in-twos, etc., which makes it a very difficult and expensive operation. With the "AB" brake however, it is possible to slow down and release without stopping. This was demonstrated in a very satisfactory manner on the loaded train which was operating between Russell, Ky., and Fostoria, O.

In connection with the operation of "AB" brakes on long trains, we received an inquiry recently as to how it would operate on a 200 car train. Our answer was to the effect that this brake will operate as well on 200 cars as 100 cars. We do not know, however, just what the slack action might be in stopping a 200 car train at various speeds as it has not been tried to date but as far as the valve itself is concerned, it does not make any difference how many cars are coupled together. If you had 10,000, it would operate just the same. In other words, in applying the brakes, you start the first brake to application position and it in turn takes air out of the brake pipe and applies the brake on the following car and this continues on indefinitely. While there is no limit to the number of brakes that will apply, there is necessarily a limit to the number that will release because, in release operation, it is found difficult to promptly raise the pressure on the rear end of these very long trains although the fundamental improvements in the "AB" brake make it possible to raise the brake sufficiently prompt on the rear of 150 car trains to insure a prompt release.

I have little further to add on this subject except that it has occurred to me in looking at the diagrams shown on the screen tonight that some of you may entertain the thought that the device is complicated and would be expensive to maintain. You will be interested to know that in the design of this valve, while there are more parts to it than the "K" valve, still each part has been so designed to reduce to a minimum difficulties that might arise under road service conditions and not only have the valves been made of ample size and of the best material for their purpose but adequate strainers are employed so as to keep foreign matter out of the delicate parts and we feel quite sure from our study of this problem that the maintenance expense of the "AB" equipment will be materially less than the present "K". Reviewing this detail with other mechanical appliances used on railways, it is interesting to look back some twenty-five years to the locomotive then in service which had little mechanism outside of the actual running gear of the engine and the air brake.

If we were successful in running from 100 to 150 miles without something giving trouble, upon reaching the Terminal the engine was placed in the Roundhouse and all parts checked and adjustments made, whereas, today our modern locomotives are covered with devices of all shapes and sizes. In other words, it is largely an assembly of automatic appliances and yet with all this complication, our modern locomotives run thousands of miles without any difficulty or even reaching a Roundhouse. The mere fact that a device is more complicated does not necessarily mean that there will be an increase in maintenance expense. Thank you.

PRESIDENT: I think you will all agree that we did not make any mistake in introducing Mr. Down as a salesman. We have with us Mr. R. T. Rossell, President of the Bessemer & Lake Erie Railroad. We would like to get his reaction on this question.

MR. R. T. ROSSELL: Mr. Chairman, I talked enough at the last meeting to last for two years. I know very little about the subject and I think I had better sit down.

PRESIDENT: Mr. J. E. Hughes might give us experience with the air brake from an operating standpoint.

MR. J. E. HUGHES: The address of the evening on the "AB" brake has been very instructive and no doubt will be appreciated by many Railroad men here tonight. I recall that a good many years ago, being in the Operating Department and my duties were to build up trains, I had to pick out four cars having air brakes which were placed on the head end of all freight trains, and as the air brake equipment on freight cars was increased on the head end of each train until today all cars are equipped and operated with air brakes, from the engine by the Engineman. I recall also in the early days of air brakes, employes in Train and Engine service were required to educate themselves in the use of the New Air Brake. The Westinghouse Company offered to employes a quartered brake valve and triple valve and classes were held on Sunday afternoon to study and learn the use of the New Air Brake. On the Pittsburgh & Lake Erie Railroad this work was assigned to one of our Engineers, Mr. John K. Yohe with the title of Air Brake Instructor, who for many years taught our men in the use and development of the Air Brake. After Mr. Yohe was called away his place was filled by another Engineman from the service, Mr. R. M. Long, who became very efficient in the development and use of Air Brake, who is now retired but is present here tonight.

The development of the Air Brake led to safer operation and increased speed of trains. The straight air brake resulted in faster switching of cars. I am very glad to be here tonight to enjoy the very fine talk on this very practicable use of the new "AB" brake, which is very much of an improvement over other types of air brake and will do so many things to improve the use of all units in the trains of today; especially the releasing of brakes after they are applied, to speed up the movements when obstructions have been cleared from the way, instead of bleeding the brake cylinders of many cars that would not release, resulting in delay and damage to equipment in attempting to start the train with stuck brakes. The Westinghouse Company, through all these years by their efforts at efficiency, are to be commended on the results as indicated by the Speaker and the demonstration shown tonight, and I, like many others no doubt, appreciate being at this meeting.

PRESIDENT: Mr. Hughes mentioned Mr. Long as a former air brake supervisor on the P. & L. E. Railroad. We would like to hear a word from him.

MR. ROBERT M. LONG: Mr. President, Mr. Farmer and Gentlemen: Mr. Farmer did not bring out a point which I had expected him to discuss and that is the excessive shocks that now occur in trains due to the brake performance not being adequate so that the pressure is built up high quickly on the head end and very slowly at the rear.

I had the pleasure of witnessing the tests of brakes which it was claimed met the requirements for braking freight trains. A lot of fellows picked up a patent in San Francisco and developed a brake which they insisted was pretty good and they set it up for test in Courtland Street, New York.

We went there and made a report on that test which was not very favorable. The brake was brought to the attention of the Federal Government and it was decided to test it on the road. We went to the Norfolk & Western to witness trials of this brake in comparison with the standard "K" brake on trains of 100 to 125 cars. As a result of those trials, I still have a lot of scars on my back.

In the road test to which I have referred, and having a train made up of the first 50 cars "K" equipment and the rest of the cars proposed brake, shocks did develop. We could not transmit emergency brake action 5 cars back of the first 50 and as a result, we observers changed cars, instruments and all.

After we found that this brake would not work as claimed it was taken to Purdue University. A test was made on another railroad and at Purdue University. The tests made at Purdue resulted in the A. R. A. deciding not to subject it to road trials.

Tests were then made with "K" equipment and experimental brake equipments at Eugene, Oregon, and it was here that the requirements for a new brake were establishd. The "AB" is a real brake that will do anything that any railroad man wants it to do. I know that if an engineer reasonably follows instructions he cannot break a train or stick a brake with this valve.

It is often said that a lot of instructions must be given with this valve. This is not true. The only instructions necessary are to instruct the car inspector about testing the valve because certain functioning of the valve may be mistaken for evidence of leakgae.

I never see anything written or published about this new brake without feeling like saying "Do not take it home and throw it into the waste basket." Study it for its worth in dollars and cents. Consider the saving it will accomplish in reduction of flat wheels, stuck brakes, the time trains are delayed and especially those occasions when there is danger to other equipment after a train buckles. A train cannot be buckled with this valve.

When this brake was tested in mountain operation we did not find some wheels cold and others too hot. There will not be any hot wheels but all wheels will be of even temperature because the valve does just what has ben shown on the charts.

Another point which was not brought out as clearly as I would like was that for the first application of the brakes the air consumption was not as great as with the "K" equipment. The new brake does not have to use so much air to get the brake on. When releasing trains of old equipment up to 150 and 190 cars it is necessary to resort to special instructions for handling. You do not need to do this with the new valve because it will do the trick itself.

One very great expense on the railroad is damaged freight caused by bad brake operation and rough handling of brakes. This new brake will eliminate the whole thing. I have seen this brake grow from the beginning. I am convinced it will make money for the railroads and pay for itself in a short time.

PRESIDENT: Mr. Karl Berg, may we hear from you?

MR. K. BERG: I have been much interested in the lecture and the illustrations, also in the remarks that have been made in favor of the "AB" Brake, and agree that the railroads will soon be engaged in putting on this brake, as it has been fully demonstrated and some experience already gained in its actual use.

It occurs to me that we should get busy and give all concerned who will be expected later to use this brake, instructions regarding its operation. If any information is available that can be used advantageously in setting up such instruction classes, I will be very glad to obtain copies.

PRESIDENT: Mr. Robert Cunningham, Mechanical Expert of the Westinghouse Company?

MR. ROBERT CUNNINGHAM: Mr. Chairman, I have nothing to add to what has been said by the speaker. It is getting late and I think I had better be excused.

PRESIDENT: Mr. A. L. Berghane?

MR. A. L. BERGHANE: Mr. President and Members, I do not think I have anything to offer. Mr. Farmer gave a very fine explanation of the brake and as Mr. Cunningham says the hour is getting late. The Westinghouse Air Brake Company will be glad to explain this to anybody who would care to examine it.

PRESIDENT: Mr. George L. Cotter, of the Westinghouse Company?

MR. GEORGE L. COTTER: Mr. Chairman, I don't believe I can add anything to what has already been said by Mr. Farmer, and Mr. Down explained it so clearly, and I think I shall have to follow Mr. Cunningham and not venture any further remarks.

PRESIDENT: I see Mr. Samuel Lynn. He may have a word to say to you.

MR. SAMUEL LYNN: Mr. Chairman and Gentlemen: I told your President I did not want to be called on because I felt that we had so much engineering talent at the Club meeting here that we would be able to get a lot of information on this subject and I did not think I would be able to contribute anything worth while to this discussion. I might say that through some of my friends in the Westinghouse Company I have had the privilege of seeing the new brakes demonstrated. Professor Endsley stated that he went through Purdue University but it was before they started to test the air brakes. He hasn't anything on me as I was permitted to go through in one day, in fact I had the privilege of witnessing this air brake test at Purdue University on several different occasions. It is my opinion the paper of the evening and the slides that were presented speak for themselves. Anyone who has had to work trying to keep the air brakes in order knows what they have to contend with and the mechanical men present whose duty it is to know that the air brakes are kept in good working order can well appreciate the improvement that has been made on the new brake equipment.

Mr. Down has stated that the Pennsylvania Railroad has applied the new brake to a number of their cars and while he ws speaking the thought occurred to me that he must have a diploma as a Sales Engineer as it is my understanding that when new equipment is purchased the new air brakes are required to be applied to new cars as this is now a requirement of the A. R. A.

PRESIDENT: We heard from a former professor at Purdue, and we have a man in the audience who is now going to Purdue, Mr. Frank Glenn and I would like to have him stand up so we can see him. And we will hear from his father, Mr. J. H. Glenn.

MR. J. H. GLENN: I do not know why you should call on me when so many much more prominent members of the Club have said there was nothing they could add to what has already been said. I just want to say that there is nothing I could add. However, I am very glad to have been here tonight and I have certainly enjoyed the privilege. I have had the satisfaction of witnessing a demonstration of this brake at Wilmerding and I do not think anybody who witnessed that demonstration could think anything other than that it is one of the greatest improvements that has been made in the air brake since it first came out.

PRESIDENT: We have saved the best for the last. I am going to call on Mr. Rufus Flinn.

MR. R. H. FLINN: Mr. President and Gentlemen: We have listened to a very interesting and instructive paper by Mr. Farmer, and I feel that the discussion has also been very interesting and instructive. I think we owe a considerable debt of appreciation to Mr. Farmer for coming here and presenting this paper. Before I move a vote of thanks I just want to say that there is an interesting sidelight to this discussion. In a conversation I had with Mr. Down before the meeting I asked him how they came to call this brake the "AB" brake. He said they had run out of all the letters of the alphabet in the various previous and more or less obsolete equipment, so they started in all over again at the beginning of the alphabet. That is a very logical reason. There is another reason and that is that presumably they feel safe in saying that it will introduce a "New Deal" in the air brake operation and maintenance in the results that we may expect so I think it is a very proper name.

I do not think you want any discussion from me at this time in the evening, but I will take the opportunity to move a rising vote of thanks to Mr. Farmer for coming here and giving us this very excellent paper.

The motion prevailed by unanimous vote.

There being no further business, ON MOTION the meeting was Adjourned.

J. D. CONWAY, Secretary.

In Memoriam

CARL L. LAUGHNER

Joined Club October 24, 1913

Died October 31, 1933

ARTHUR D. PRINGLE

Joined Club March 25, 1926

Died June 20, 1933

OFFICIAL PROCEEDINGS
RAILWAY CLUB OF PITTSBURGH
$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. JAN. 25, 1934. No. 3.

THE DIESEL ENGINE

By JOHN DICKSON, Manager Diesel Electric Engineering Division,
Westinghouse Electric & Manufacturiing Co., South Philadelphia, Pa.

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 3.

Pittsburgh, Pa., Jan. 25, 1934

$1.00 Per Year
25c Per Copy

INDEX—ADVERTISERS.

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PROCEEDINGS OF MEETING

JANUARY 25, 1934

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock P. M., with President C. O. Dambach in the chair.

Previous to the regular program a delightful musical entertainment was given by the Westinghouse Club Quartette, at the close of which, on motion of Professor Endsley, a vote of thanks was extended to the Quartette in appreciation of their entertainment.

Attendance, as shown by registration cards collected at door, 218, as follows:

MEMBERS

Allison, John
Ambrose, W. F.
Babcock, F. H.
Baker, George N.
Balzer, C. E.
Barr, H. C.
Beam, E. J.
Beaver, Roy C.
Berg, Karl
Berghane, A. L.
Bone, H. L.
Borg, John E.
Bowden, F. S.
Brown, E. L.
Burel, W. C.
Burgham, M. L.
Burnette, G. H.
Cannon, T. E.
Carlson, L. E.
Carmack, J. L.
Carr, T. W.
Carruthers, G. R.
Christy, F. X.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Cotter, G. L.
Courtney, H.
Cruikshank, J. C.
Cunningham, R. I.
Cunningham, W. P.
Dambach, C. O.
Davis, Charles S.
Dempsey, P. W.
Dickinson, T. R.
Dihle, J. E.
Emery, E.
Emsheimer, Louis
Endsley, Louis E.
Fenton, H. H.
Flinn, R. H.
Forsberg, R. P.
Fowler, W. E.
Freshwater, F. H.
Fry, L. H.
Fults, J. H.
Furch, G. J.
Gilg, Henry F.
Gillespie, J. Porter
Glaser, J. P.
Goda, P. H.
Guinnip, M. S.
Haller, Nelson M.
Hancock, Milton L.
Hansen, William C.
Hare, J. K. B.
Harper, G. C.
Herbert, T. C.
Herrold, A. E.
Hilstrom, A. V.
Holmes, E. H.
Honsberger, G. W.
Hoover, J. W.
Hunt, Lawrence
Kapp, A. C.
Kaup, H. E.
Kelly, L. J.
Kentlein, John

Kirk, W. B.
Kraus, Raymond E.
Kromer, W. F.
Kroske, J. F.
Kummer, Joseph H.
Lanahan, Frank J.
Lanahan, J. S.
Lee, L. A.
Loeffler, George O.
Logan, J. W., Jr.
Long, R. M.
Longdon, C. V.
Lundeen, Carl J.
Maliphant, C. W.
Manson, A. J.
Masterman, T. W.
Mayer, L. I.
Mills, C. C.
Misklow, C. J.
Misner, G. W.
Mitchell, W. S.
Moir, W. B.
Moore, D. O.
Morgan, A. L.
Morgan, Homer C.
Moses, G. L.
Muir, R. Y.
Murray, Stewart
Mussey, D. S.
McHugh, C. A.
McIntyre, R. C.
McKinley, A. J.
McKinley, John T.
McKinzie, E.
McLaughlin, H. B.
Nieman, Harry L.
Lynn, Samuel
O'Leary, J. J.
Orbin, Joseph N.
Orchard, Charles
Palmer, E. A.
Passmore, H. E.
Pickard, S. B.
Pringle, H. C.
Purchard, Paul
Rauschart, E. A.
Redding, R. D.
Reed, M. R.
Reeder, N. S.
Renshaw, W. B.
Richardson, E. F.
Rose, A. J.
Schadt, A. D.
Schrader, A. P.
Sekera, C. J.
Severn, A. B.
Simons, Philip
Smith, H. K.
Snyder, F. I.
Stamets, William K.
Stein, J. A.
Stevens, R. R.
Stoffregen, Louis E.
Stucki, A.
Sullivan, A. W.
Sutherland, Lloyd
Swope, B. M.
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Thomas, T.
Trax, L. R.
Triem, W. R.
Tuttle, C. L.
Vollmer, Karl L.
Walther, G. C.
Weaver, W. Frank
Webster, H. D.
Wikander, O. R.
Winslow, George W.
Winslow, S. H.
Woods, G. M.
Wright, Edward W.
Wright, John B.

Yarnall, Jesse

VISITORS

Atwell, C. A.
Blair, John H.
Boggs, L. S.
Burkle, J. R.
Burriss, W. C.
Christy, G. J.
Davis, William B.
Dickson, John
Dunham, C. W.
Eichenlaub, E. H.
Elder, Earle F.
Emery, R. J.
Frack, William M.
Freed, H. G.

Freel, John L.
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Macdonald, G. A.
Maloney, J.
Manzey, Paul H.
Menaglia, V. A.
Mullen, R. M.
Murphy, T. H.
Musgrove, W. W.
Mycoff, George H.
Mycoff, George H., Jr.
McCoy, Verl E.
McKinley, Lawrence
Niesemann, Fritz
Owen, E. A.
Pickels, H. D.
Rensch, R. H.
Riley, L. G.
Rohyans, A. V.
Rupp, C. E.
Schenck, S. B.
Scoville, E. C.
Sloan, J. W.
Smith, R. B.
Smith, Sion B.
Smith, W. H.
Steel, E. T.
Stevenson, L. N.
Stotler, Harvey K.
Taft, Howard
Walker, R. H.
Walters, C. R.
Whitney, E. F.
Wilhelm, Margaret S.
Woldman, T. S.

PRESIDENT: As usual, we will dispense with the roll call as the registration cards give a complete record of attendance.

If there is no objection we will dispense with the reading of the minutes as they are in the hands of the Secretary and will shortly be distributed to you.

SECRETARY: I am sorry to have to make a slight correction of that statement. The corrected copy for the printed discussion has not yet been returned to the Secretary, so the Proceedings of the last meeting will have to be delayed slightly in their publication.

PRESIDENT: I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Boggs, L. S., Field Supervisor, Oil Electric Equipment, Westinghouse Electric & Manufacturing Company, 7150 Penn Avenue, Pittsburgh, Pa. Recommended by G. W. Honsberger.

Bricker, O. F., Manager Transportation Advertising, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by A. P. Schrader.

Crouse, John L., Assistant to Transportation Manager, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by G. W. Honsberger.

Schenck, S. B., Railway Engineer, Westinghouse Electric & Manufacturing Company, 2640 Graham Boulevard, Wilkinsburg, Pa. Recommended by G. W. Honsberger.

Streamer, A. C., Sales Manager, Transportation Department, Westinghouse Electric & Manufacturing Company, 5 Newport Road, Wilkinsburg, Pa. Recommended by G. W. Honsberger.

PRESIDENT: In accordance with the provisions of our By-laws these proposals will be referred to the Executive Committee and upon approval by that Committee the gentlemen will become members without further action of the Club.

Are there any announcements, Mr. Secretary?

SECRETARY: Since our last meeting we have received information of the death of one of our members, John P. Bourke, Vice-President, Ewald Iron Company, New York, N. Y., whose death occurred on January 17, 1934.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings.

If there is no further business, we come to the paper of the evening. We are very fortunate indeed to have with us tonight Mr. John Dickson, Engineer, formerly with the Beardmore Company, Glasgow, Scotland, and now connected with the Westinghouse Electric and Manufacturing Company, South Philadelphia, Pa., who will address the Club on the subject of The Diesel Engine. I take a great deal of pleasure in presenting to you Mr. Dickson.

THE DIESEL ENGINE

By JOHN DICKSON, Manager Diesel Electric Engineering Division, Westinghouse Electric & Manufacturing Company, South Philadelphia, Pa.

In presenting this paper on Westinghouse Diesel engines to the Railway Club of Pittsburgh the author wishes to express his appreciation of the opportunity.

It would seem significant of the times that a paper on this subject is requested and considered of interest to Railroad men.

The reason however, may not be hard to determine when we realize that Railway transportation has by far the greatest mechanical efficiency of any system of transportation yet discovered and secondly that the Diesel engine is unsurpassed in thermal efficiency by any other type of prime mover.

Here we have a combination that is meriting your attention.

The Westinghouse Company in recognizing the potentiality of this combination realized that the Diesel engine to be a tool of transportation must be compact, and yet it must have weight characteristics consistent with the ruggedness required of service, in short they have been advocates of the moderately light weight high power Diesel engine with electric drive.

The object of the paper is therefore, to convey the experience back of the Westinghouse Company in advocating the Diesel engine for railway use, the position of the art today a reliable piece of motive power equipment, and the lines along which development can be expected in the future.

If we go back to 1925 we find the advent of the Westinghouse Diesel engine being heralded as of too light weight, too high speed and, therefore, unsuitable for the severe conditions with which they would have to contend in railway service; today the evidence substantiates that the principles on which these engines were evolved were thoroughly sound. Other manufacturers during the past year have realized the need for higher speeds and have been boldly stepping out in this direction.

Furthermore, manufacturers of the larger size in gasoline engines have conceded that the thermal efficiencies plus other advantages which have been forcibly drawn to our attention of late will make the Diesel engine stand out as the one of general adoption. The Diesel engine does not differ materially in constructional design from the gasoline engine, the carburetor, ignition timing and spark plugs have been substituted with the fuel injection pump and atomizer.

The higher pressures resulting from the more thermal efficient cycle demands that the stress members be more robust, and that bearing areas be more liberally proportioned.

The cost of manufacture compared with gasoline engines is in the main dependent on the numbers in production.

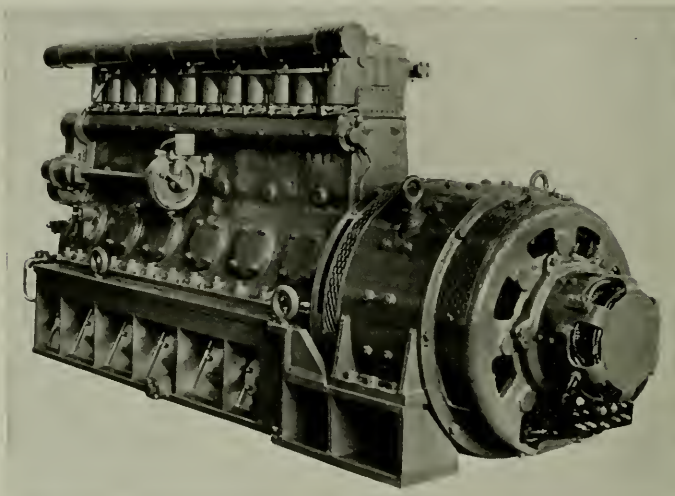
The original engines were of 8¼″ diameter by 12″ stroke delivering 300 bhp. in six cylinders at 800 rpm. They were built in this country under agreement with the Beardmore Company of Glasgow. Four rail cars and eight switching locomotives were so equipped. They are in service today, having completed almost one million rail car miles and 110,000 locomotive hours. These engines could be said to have opened up the vast possibilities of this mode of transportation, true they could not be said to be the finished product, but this is characteristic of every new engineering project and our sincere thanks are extended to those pioneers, superintendents of motive power and master mechanics who have worked with us during that period of imperfections.

Early in the use of these engines it became evident that 50 bhp. per cylinder was not the best unit size to be desired, so experimental work was carried out on a single cylinder 9″ diameter 12″ stroke with a speed of 900 rpm. giving 66 hp. per cylinder. This size today is represented in the complete line of Westinghouse four cycle engines. To the engineer experienced in the development of the internal combustion engine, the attainment of the perfected reliable unit follows along very distinct experimental lines, he designs and builds a single cylinder engine, diligently he eliminates weaknesses that may be apparent. Single cylinder operation, however, is not sufficient in itself, the law of averages demanding that he base his predictions on more than one, so he proceeds with the multi-cylinder units resigned to the need for long endurance tests, bearing in mind the duplication of tests generally met with in field service. This completed, he braces himself for the unknown factors with which he will have to contend in the field. Specification for the fuel and lubricating oil are written in broad terms to permit the engine user to select a marketable fuel or lubricating oil from the supplier with whom he wishes to deal. Two fuels can have apparently identical physical characteristics and meet the specification in every respect and yet their reactions on the engine from a wear and tear standpoint may be widely different.

The water used for cooling may have corrosion characteristics. Methods of engine operation and maintenance may be contrary to what he visualized. His design may be criticized but invariably he lives this down by correction of some of these field factors.

I now propose with the aid of slides to describe the Westinghouse line of four cycle engines, I will purposely refrain from entering into the technicalities of these designs bearing in mind that your primary interest is one of the suitability of these engines for railroad use, the correction of faults experienced in the earlier units insofar as they affected maintenance and availability.

View 1 shows the six cylinder engine which is entirely of Westinghouse design, it delivers 400 bhp. at 900 rpm. with a piston speed of 1800 ft. per minute.

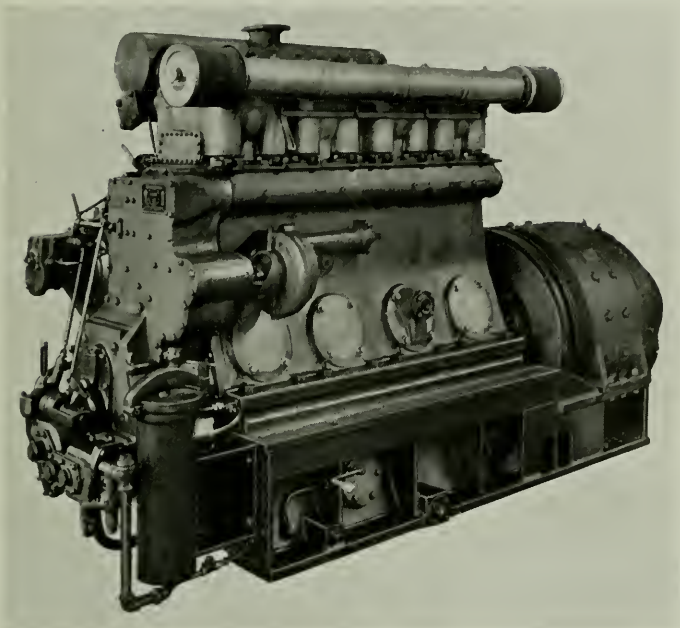


VIEW 1

The weight of this unit is 30 lb. per hp. excluding the generator and 45 lb. per hp. with the generator. The general dimensions are 13 ft. 8 in. overall with a maximum height of 5 ft. 8 in. and an overall width of 4 ft. 2 in. These dimensions, as you can realize, permit ready accessibility in the rail car and locomotive. Thirteen of these engines have seen service in rail cars and eight in switching locomotives totaling to date two million rail car miles and one hundred and twenty-five thousand locomotive hours.

These six cylinder units were the foundation on which the other engines of the line were based.

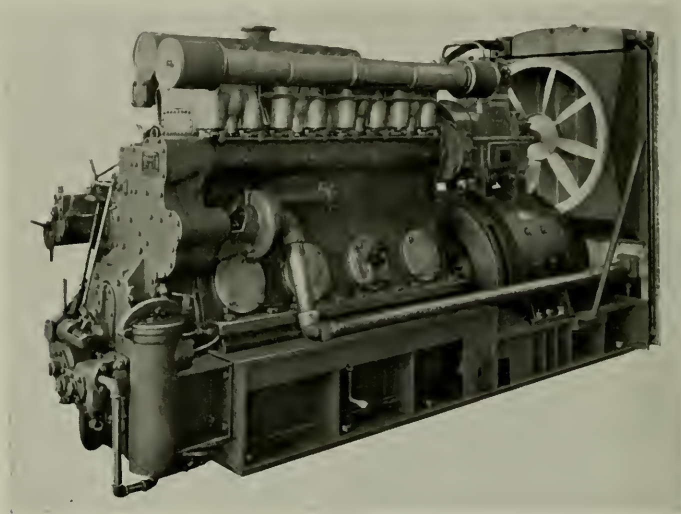
View 2 shows the four cylinder engine as designed for rail car use. It is of 265 bhp. which makes it suitable for Diesel conversions of existing gas electric equipments. This is a field which shows considerable promise in many instances in view of the economic advantages. This engine weighs 34.7 lb. per hp. without the generator and 56 lb. with the generator included. It has an overall length of 11 ft. 2 in. with the same height and 9 in. less in width than the six as a result of the smaller generator. The engine is complete with muffler, air strainer, lubricating oil filter, oil storage in the bedplate and necessary auxiliaries. An interesting feature of this four cylin-



VIEW 2

der design is the complete absence of vibration. The method of overcoming the inherent unbalanced secondary forces I will describe later.

For locomotive use, the four cylinder engine, View 3, was designed with mechanical auxiliaries. This naturally is a boon to the locomotive builder, due to ease of assembly in the locomotive. You can see from the view the compactness of the arrangement, obtained with 9 in. additional length over the rail car four cylinder engine just previously shown. The air compressor for the brakes is mounted on top of the generator, the drive for the compressor has been taken from the end of the camshaft and is geared up from 450 rpm. of the camshaft to 1000 rpm. of the compressor. The drive for the radiator fan is an extension of the compressor shaft. Flexible couplings for both alignment and torsion are accommodated on each side of the compressor. The radiator fan has eight blades unequally spaced which provides practically silent operation at 1000 rpm. The radiators provide cooling of both the lubricating oil and the cooling water, the header at top of the radiator dispenses with the need for a separate cooling water tank. Four of these en-

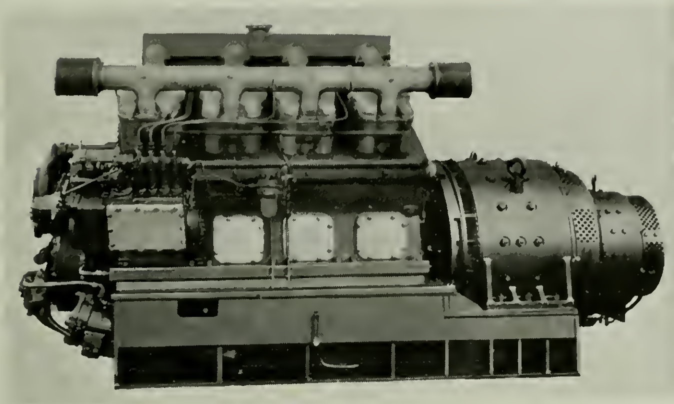


VIEW 3

gines have been applied to locomotives and are giving very satisfactory performance.

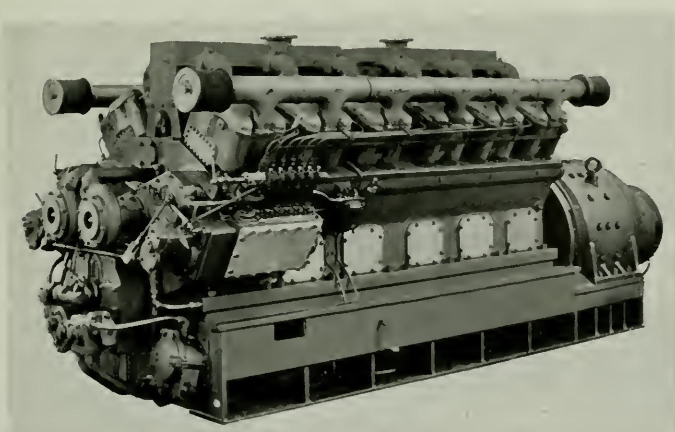
Westinghouse practice is to submit the first engine of each size of the line to a thorough endurance test before field service is contemplated. This non-stop endurance test without adjustment whatsoever is a very severe one. For fifteen days or 360 hours the engine delivers full torque at top speed followed without stopping with an acceleration schedule of fifteen days. The acceleration schedule is automatically controlled, one minute full power at top speed and one minute idling which comprises over 20,000 cycles. The last four hours of the 720 hours the engine must deliver full power at a fuel consumption within the contract figure. This thirty day test is equivalent to a rail car running four times non-stop across the continent.

View 4 shows the eight cylinder vee engine which delivers 530 bhp. at 900 rpm. View 5 shows the twelve cylinder vee engine which is rated at 800 bhp. at 900 rpm. This engine weighs 30 lb. per hp. and 40.5 lb. including the generator. Its overall length is 16 ft. and has a maximum width of 5 ft. 7 in. and a height of 5 ft. 6 in. This weight includes the bedplate which can be dispensed with in those applications where the underframe of the locomotive permits mounting direct to the frame. It is a 60° vee with two rods on a common crankpin, the cyl-



VIEW 4

inders being offset to provide this. The use of 60° vee has two distinct advantages, one is that the third order critical is eliminated in the twelve vee and secondly, that in the eight vee the unbalanced secondary forces are represented by a revolving mass running at twice engine speed. View 5 shows the engine complete with all auxiliary equipment including the exhaust muffler ready for assembly in the locomotive. Connected to the two openings shown on the exhaust muffler there are fitted exhaust ejectors which are so designed that an equal volume of air from the engine room is drawn out with the exhaust



VIEW 5

gases. It eliminates the need for flexible couplings between the engine and the locomotive frame and enables the exhaust fumes to be thrown well clear of the locomotive with resulting benefit to the locomotive operator and passengers of rail cars or high-speed trains. The general appearance of the engine conveys the impression of rigidity. This feature of the design received very careful analysis and consideration, vibrograph tests have shown the movement at center of the crankcase in its length to be negligible. The engine has two camshafts driven from the gear train located at the end remote from the generator, the two camshafts enable the same cylinder head to be used, as in the four and six cylinder designs. This feature has been very closely adhered to wherever possible in the line of engines, replaceable parts such as pistons and rings, wrist pins, cylinder liners, cylinder head valves, atomizers and fuel pumps and the majority of engine auxiliaries are identical in all engines, you will notice the fuel pumps are located on each side of the engine, grouped in banks of six with an individual pump for each cylinder. Two water pumps are located at the front end, supplying 160 gal. of water per minute to each bank at top speed. The air intake manifolds are fitted with air strainers. Lubricating oil filter is shown on the right hand side of the bedplate accommodated externally. The vibration damper is attached to the crankshaft underneath the two water pumps

This first twelve cylinder engine successfully completed its endurance test last year. During the test it was very noticeable the number of railroad men who availed themselves of the opportunity to inspect this engine in operation and to view the parts after the engine was completely dismantled for inspection and measurement. Various estimates have been computed as to what these endurance tests are equivalent to in service hours, some estimates in switching service give it as much as one year. The small amount of wear that could be determined reflect that good serviceability from these units is assured.

Westinghouse is therefore, in a position to supply four engines of the four cycle type, the straight four at 265 bhp., the straight six at 400 bhp., the eight vee at 530 bhp. and the twelve vee at 800 bhp.

These engines all weigh in the neighborhood of 30 lbs. per bhp. This is a figure that seems just right for railroad work. It provides a margin to insure sufficient rigidity without sacrificing advantages to be gained during maintenance and overhauls in the man handling of the parts. The 9″ cylinder is considered the limit in size so that piston and connecting rod can be lifted out without the use of a crane.

The piston is an aluminum casting with five gas rings and one oil scraper ring, the oil scraper ring being located beneath the wrist pin opening so as not to overrun the liner at the bottom of the stroke. The wrist pin is of nickel steel and is free to move in the piston and connecting rod, aluminum caps with spherical radius are fitted to the ends of the wrist pin to protect the cylinder liner from damage. Here is a small point that has been known to cause considerable havoc in some designs if the radius of the cap does not agree with the cylinder bore and if the cap is not a running fit in the wrist pin extreme grooving of the steel or cast iron liner will result. The connecting rod is of nickel chrome forged steel with a bronze bush fixed in the top end of the rod. The large end has four bolts with a bronze shell in halves and babbitted with lead base babbitt with adjustable shims. In some of our earlier equipments you may have heard of bottom and bearing trouble; investigation of the flexing of the rod, more adequate provision for lubrication and attention to the babbitting of the metal to the shell gives the position today that failure of a connecting rod bearing is practically unknown.

To dismantle a piston and connecting rod the cylinder head is lifted off, the cap of the rod removed through the doors in the crankcase and the piston and rod lifted up through the cylinder liner. The combined weight of these is 93 lb. which enables them to be man handled easily.

The crankcase is of cast steel, made in our foundry here at Trafford. The crankshaft is fitted at the lower end of the crankcase which relieves the bedplate of any gas forces which would result if the shaft was fitted to the bedplate. We have completed the design of a welded crankcase which is considered to have distinct patentable features. It will be lighter in weight than the cast steel structure due to the thickness of metal necessary to obtain sound castings. The question of manufacturing cost compared to the casting has still to be determined.

Cylinder liners fit into the crankcase with two rubber rings fitted in the liner to form a water joint at the lower portion of the crankcase to prevent water entering the bedplate. This is a very simple method that has given no trouble. These cylinder liners were first made of carbon steel, then of nitrided steel. Today nickel cast iron liners is the practice, they are centrifugally cast, have a homogenous structure, economical to produce and present an ideal bearing surface for piston and rings.

With the carbon steel liner some engine users when considering replacements preferred to regrind the liner for use with oversized pistons. It is doubtful if this practice is warranted. The reduction in cost with the nickel cast iron liner suggests new liners as the better procedure.

Wear of the cylinder throughout its length is generally infinitesimal. A ridge forms at the top of the ring travel.

The cause of the ridging is one that has intrigued internal combustion engineers for years. Differences in rate of wear between individual cylinders of the same engine and on different engines has been difficult to account for. Tests recently reported show that the temperature of the cylinder wall of the gasoline engine had a very marked effect on the rate of wear due to condensation of the products of combustion. The action was considered to be more corrosive than abrasive. An interesting test was quoted in which the engine was put through a number of cycles starting from cold, heated up for a period and then cooled down. If the warming up period was prolonged with five minutes of idling then the wear would be increased eight times.

Our experience has shown that the fuel oil has considerable influence in the rate of wear found. In one test on an engine in twenty-four hour day switching service two fuel oils with widely varying viscosities were mixed in different proportions. The results showed that the greater the ratio of the lower viscosity fuel in the combination the less wear occurred at the ridge in the cylinder liners. It might be deduced from this that the use of low viscosity fuel should be recommended. If we assume that the viscosity of the fuel is some indication of its lubricating qualities then too low a figure would approximate to the cutting characteristics of kerosene with subsequent detriment to the fuel pump plungers and atomizers. From this standpoint we find that marketable fuels with viscosities 40 to 50 seconds Seybolt at 100° F. give the best all round results.

Data compiled on both slow speed and high speed Diesel engines shows the wear to be independent of the speed of revolution which would indicate factors other than abrasion. This could also be said of the piston material and the lubricating oil consumption.

Further knowledge may disclose that qualities in the lubricating oil to prevent corrosion may influence the rate of wear at the ridge.

It is very rare for the cylinder liner to wear barrel shaped. Occasions on which this has occurred it has been corrected by the use of air strainers which would indicate pure abrasive action resulting from impurities in the air drawn into the cylinder.

The cylinder head is an aluminum casting containing two inlet and two exhaust valves of Silchrome steel which give highly satisfactory service. The seats for the valves are of steel cast in the head, provision is made for renewal of these seats although no occasion has arisen to date where replacements have been necessary. Replacement of valves and valve guides in the earlier equipments was not due to wearing out of the valves at the seat but due to wear on the valve stem. This wear was caused by the action of the valve rocker mechanism which tended to cant the valve and cause wear at the top and bottom. A satisfactory solution was obtained to overcome this by providing a ball bearing cap at the top of the valve stem.

The Westinghouse design of the fuel system has a fuel pump for each cylinder. The cylinder is made of special cast iron which from a production standpoint has proved remarkably free from trouble considering the high pressures that exists in the cylinder during the pumping stroke. The fuel pump plunger is made of tool steel. The top end of the plunger is shaped in the form of a helix which as it passes over a port in the pump casting meters the fuel to the engine cylinder. An idea of the degree of metering that is required might be demonstrated by the remark that the amount of fuel that is delivered to the engine cylinder per cycle would lie on a person's small finger nail. We undertake the manufacture of our own fuel pump equipment. In regard to the fuel pump plunger and cylinder it was our previous practice to lap these together, today by the use of a multiplicity of reamers the fuel pump body is finished to size while the plungers are ground to a tolerance that permit the parts to fit together to give clearances in the region of two ten thousandths without requiring additional hand work. The governor of the engine controls the rotation of the fuel pump plunger so that different depths of the helix prevent the fuel trapped in the fuel cylinder from returning to the suction side of the pump. On the top of the fuel pump plunger is a small ball valve which is used for stopping the engine. Opening of this ball valve can be controlled manually in order to cut out individual cylinders, which has dispensed with the need for vent blocks in the cylinder head. This naturally has cheapened the production and permits continued operation of the engine in the event of fuel pipe breakage which today is very rare. The pump is so designed that the fuel pump plunger can be set relative to the other cylinders so that equal quantities of fuel can be pumped to each cylinder. Individual timing is obtained by raising or lowering the pump plunger in the eccentric strap through which it is driven. The plunger diameter has a reduced portion which in the event of a plunger seizure fracture will occur at this section, thereby preventing further damage to the driving mechanism.

Governing of the engine is controlled by means of a patented oil type governor. This is in effect a geared oil pump driven from the engine regulating oil pressure to the governor proper. Pressure varying with changes in speed as result of load or by the operator altering the bypass opening in the pump. The oil pressure is transmitted to a system of relay and operating pistons attached to the fuel pump plungers.

Variable timing is obtained by lateral movement of a helical spline attached to the fuel pump shaft which changes the angular relationship of crankshaft and fuel pump.

The fuel oil is drawn from a tank by a gear booster pump which is either mechanically or electrically driven depending on the installation. This pump supplies fuel under pressure of 40 lbs. to the main fuel pump intake. From there it is discharged from the individual pumps under high pressure of from 6,000 lbs. to 8,000 lbs. per sq. in. through a ball delivery valve located on the pump which permits the fuel piping system to be charged at all times. From a maintenance standpoint experience has shown that the fuel pipes should be well clamped to prevent vibration and subsequent failures. The bore of the pipe has an optimum value to give the best combustion in the cylinder. Too small a bore sets up frictional losses causing high pressure at the pump and considerable drop in pressure at the atomizer where the pressure is desired to give good atomization and penetration. In the engine design efforts are made to maintain the lengths of the pipes to each cylinder the same in order that the injection of the fuel set to give a maximum pressure of 725 lbs. per sq. in. at 900 rpm. will be maintained equal in all cylinders although reduced in value at the different speeds through which the engine has to operate. The atomizer located in the cylinder head is in effect a spring loaded valve which lifts at 1800 lbs. per sq. in. The nozzle holes are seven in number $14\frac{1}{2}$ thousandths in diameter.

The Westinghouse combustion chamber is practically cylindrical in shape and is so designed as to take the fuel to the air rather than that type of combustion chamber which by means of turbulence has the air swirling round in search of the fuel.

The method of lubrication of the Westinghouse engine is very simple. The bulk of the lubricating oil is contained in the bedplate which is a welded structure divided in sections so that the engine can operate on the dry sump principle. This means that the oil which is returned from the engine is drawn by means of a scavenging pump from the bedplate sump and pumped through the radiator where it is cooled and returned to the sections in the bedplate which contain the main bulk of the oil and really act as a reservoir. From these sections the pressure pump draws the oil and pumps it at a pressure of 40 lb. to a reservoir which is cast on the side of the crankcase. This is an improvement on our earlier designs of engines where a main pipe ran along inside underneath the bearing caps which was more or less susceptable to loosening with subsequent loss of oil and stoppage of the engine. Through drilled holes in the crankcase the oil is lead separately to a circular groove in each main bearing. This circular groove acts as a reservoir and permits a hole drilled from the journal to the crank pin to obtain oil for the crank pin bearing. Lubrication of the top end of the connecting rod is obtained by means of oil led from crank pin bearing through a small pipe on the side of the rod to the top end. At the far end of the main oil rail in the crankcase oil pressure is lead to the cam shaft where it is permitted to spill over on gears which drive the auxiliaries at the front end. All Westinghouse engines have a simple attachment which in the event of the oil pressure falling below 10 lb. per sq. in. operates the fuel pump so that the fuel is cut off from the cylinders and almost immediately stoppage of the engine occurs. This is an admirable feature as by the same token the engine will not start firing until the lubricating oil pressure has reached 10 lb. per sq. in. It is our practice to maintain the temperature of the lubricating oil between 120 and 140° F.

Engine starting is obtained by using the generator as a motor, which is conveniently arranged by the use of a starting field in the generator and the power source supplied by the battery eliminating the use of air compressor, starting air valves, high pressure air containers, etc.

I have not touched so far on the subject of vibration althought this in all high speed engines is one of considerable magnitude and demands that very through analysis be made of this feature of the design, all engines of the line are fitted with torsional vibration dampers. The writer recalls his exprience in designing the torsional vibration damper for the first Beardmore engines in Glasgow. The complete absence of any technical information and experiences with the Lanchester type of torsional vibration damper was remarkable. The energy method of computation I applied then, forms the most satisfactory way in use today.

The torsional vibration damper resembles a clutch in general construction. Two small flywheels are pulled together by means of springs, through friction clutch material to a center hub which is fixed to the free end of the crankshaft.

Torsional vibration set-up in the crankshaft will vibrate the hub. If the flywheel masses, spring pressure and coefficient of friction are properly proportioned, the hub will move relative to the flywheels and energy will be absorbed, minimizing the amplitude of vibration and the stresses on the whole shafting system.

In the running range of from 400 to 900 rpm. of these engines as many as ten critical speeds of the single noded type will occur. This applies to all engines irrespective of make in the range to which this paper refers. It is, therefore, very essential that the torsional vibration characteristics of the Diesel engine be thoroughly considered when the design is in the making. These characteristics must be considered of the whole shafting system including the generator armature masses and shaft stiffnesses.

Four cylinder engines as you may have experienced have unbalanced secondary forces due to the orthodox crank arrangement with four cranks in one plane, two up and two down. It has been known for four cylinder engines to vibrate the floor of a rail car 1/32 of an inch at twice engine speed.

The four cylinder Westinghouse engine is dynamically balanced. Two small weights revolving at twice engine speed in opposite directions to balance their horizontal components are compactly arranged underneath the center main bearing.

The balancer consists of a simple cast steel box, two weights, gears, ball bearings and spindles. It is fastened direct to the center of the crankcase thereby avoiding the introduction of couples and confines the secondary forces to the lower portion of the crankcase.

The gear which drives the balancer is threaded over the crankshaft from the one end.

Complete balance is obtained by this means, a coin placed on its edge on the crankcase will remain so while the engine runs through its complete running range. The crankshaft has a 5″ crank pin, 5″ journal, made of nickel chrome steel with balance weights forged integral with the crankshaft.

I have endeavored to interest you in this line of four cycle Westinghouse Diesel engines by pointing out the more general characteristics of their construction and perhaps stressing at times the troubles experienced in the earlier equipments, indicating some of the steps taken to overcome same, so that today the availability and maintenance records substantiate a thoroughly tried and proven product.

In concluding I would like to review with you along what lines advancement can be expected in the future. With the 800 bhp. engine, the 1600 hp. locomotive in a double power plant can be confidently built. The railroads have accepted that the Diesel electric switching locomotive has earned for itself a distinct place in their motive power equipment despite the difference in first cost compared to steam. This range of powers, engine weights and sizes will easily cover the applications in this field. The Diesel engineer, however, in considering his manufacturing costs immediately thinks on the two cycle engine with the substitution of the costly valve mechanism for ports in the cylinder and the power stroke every revolution giving more power in a smaller space.

The Westinghouse Company has interested itself in the two cycle principle for years carrying out tests on different cylinder sizes and engine arrangements. The problem is to obtain a successful cylinder. due to the greater rate of heat transfer that will match the performance of the four cycle engine in endurance ability with the same piston speed.

A very interesting development is the possibilities of supercharging the four cycle engine. By supercharging is meant the use of a blower which will discharge into the engine cylinder a greater weight of air than would normally be drawn in with the standard four cycle engine. Supercharging, as we have viewed it in the past has been the increasing of the power range that the cylinder would develop to the extent of 20% to 30% without any improvement in the specific fuel consumption. Today it means more than that, by the use of large valve overlaps the scavenging of the clearance volume can be more thoroughly carried out with the result that considerable reduction in the specific fuel consumption is obtainable and figures of 50% increase in power per cylinder appear feasible.

In single cylinder tests which Westinghouse has carried out the fuel consumption with 80 bmep. is .42 lb. per bhp. By using large valve to overlaps and supercharging this cylinder, the specific fuel consumption dropped to .366 with a bmep. of 90 lb. per sq. in. This consumption, of course, excludes power absorbed by the blower which with this included would give a figure of .385. By valve overlap is meant the included angle during which both inlet and exhaust valves are open at the same time, the inlet valve beginning to open and the exhaust valve starting to close. The drop in the specific fuel consumption means a lengthening out of the power range so that 50% increase in power including the blower is reached before the specific fuel consumption is equal to the standard engine at normal rating.

Furthermore the heat to the cooling water with this increase in power approximates the amount carried away by the unsupercharged engine which reflects on the problem of radiator sizes which becomes a factor of considerable importance in the equipping of higher power locomotives. The exhaust temperature is in the same category, accounting for no additional piston clearances having been necessary. Calculation of the mean bearing loads on the large end of the connecting rod indicates only a 4% increase for 50% increase in power output while the center main bearing mean loading is increased 9%.

This development therefore, promises that negligible increase in maintenance could be anticipated from supercharging under these conditions.

We are at present carrying out tests on the four cylinder engine to substantiate the findings of the single cylinder tests.

I would like to leave this thought with you, please do not accept this paper in the spirit that the advocates of the Diesel engine for transportation use suggest that here, there and everywhere the steam locomotive should be replaced with this newer form of equipment. They request that in the purchase of new motive power due consideration be given to the economics and operating advantages of Diesel electric equipment as compensation for their efforts in bringing this development to the sound and reliable proposition which they consider it is today.

PRESIDENT: The paper is now before you for discussion. Mr. Dickson is an expert on Diesel engines and I am sure he will be glad to answer any questions you may wish to ask.

We have not heard from Mr. Stucki for some time. May we hear from you, Mr. Stucki, on this subject?

MR. A. STUCKI: I think our President is greatly mistaken if he thinks to get any information from me on this subject. All I could do would be to ask a question or two.

Some time ago I took a trip from Vancouver to New Zealand and Australia. The boat was large, new and fast, and was driven by two cycle engines with very fine results.

Although I spent a good deal of my time with the Engineer in his stateroom, I do not know the advantages and performance of a two cycle Diesel motor over that of four cycles. We of course understand that the oil used in the Diesel motors is cheaper and easier handled than the gasoline for gas engines. At the same time the refining is done away with.

Mr. Dickson, would you be kind enough to give us a brief outline of the features and relative advantages between a gas engine, Diesel two cycle, and Diesel four cycle?

MR. DICKSON: In the gasoline engine the gasoline is vaporized and drawn in with the air through the carburetor and compressed to a compression ratio of four or five to one. By means of the spark plug combustion takes place. This is known as the Otto cycle met with in our automobiles. With the Diesel engine only air is drawn into the engine cylinder during the suction stroke and is compressed to a pressure and temperature so that when the fuel oil is admitted as an atomized spray combustion takes place. The compression pressure in the Westinghouse engine is 420 lb. per sq. in., the temperature approximately 1,000° F. The admission of fuel is such to cause the pressure to rise to 750 lb. per sq. in. This is a modified Diesel cycle, in the original one the maximum pressure obtained in the cylinder did not exceed the compression pressure which was about 500 lb. per sq. in. The higher compression ratio of 13 to 1 compared to the gasoline engine at

5 to 1 accounts for the greater thermal efficiency obtained resulting in fuel consumption figures of .4 lb. per bhp. compared to .82 lb. per bhp.

Comparing the four cycle engine with the two cycle, the former has four piston strokes to complete its cycle of operation compared with two of the two cycle. The four strokes are as follows, the air is drawn into the cylinder, it is then compressed, fuel injection takes place and the third stroke of combustion and expansion follows, on the fourth stroke the burnt gases are expelled. These operations are controlled through valves in the cylinder head. With the two cycle part of the expansion stroke is sacrificed to permit the exhaust gases to be released and the fresh air supply obtained from a blower at a pressure of 2 to 4 lbs. above the atmosphere admitted. Thus, the suction and exhaust strokes of the four cycle engine are dispensed with. Due to the shortness of time to perform this, satisfactory means of completing the scavenging process is one of the outstanding problems of the two cycle engines.

PRESIDENT: May we hear from Mr. Paul Purchard?

MR. PAUL PURCHARD: Mr. President: I have been very much interested in the lecture but I really have no discussion to offer. There is one question I would like to ask. The speaker referred to the thermal efficiency of the Diesel engine as .42 pounds per brake horsepower hour. I remember reading an article which claimed a thermal efficiency of a third of a pound. I would like to ask whether that would be applicable only to large stationary engines, such as installed in central station power plant.

MR. DICKSON: A full consumption figure of .33 lb. per bhp. per hour would be very exceptional. The majority of large slow speed Diesel engines have a good fuel consumption when .38 is obtained.

This question no doubt is prompted from the consumption figures on supercharging given in the paper. These are not comparable with multicylinder results on account of the low mechanical efficiency of the single cylinder engine, therefore the reduction in consumption is the important factor.

PRESIDENT: We have with us this evening Mr. R. H. Rensch, of the General Electric Co. I wonder if we might hear from him.

MR. R. H. RENSCH: Mr. Chairman, I can only take the opportunity to compliment the speaker for the splendid presentation he has given us tonight. I am not in any position to comment or to add anything to what has been said other than to say that the subject matter was clearly and interestingly presented and I think it was highly educational to all of us here tonight. Every railroad man will certainly find an ever increasing need to become familiar with Diesel electric equipment.

PRESIDENT: May we hear from Mr. Karl Berg?

MR. KARL BERG: Mr. Chairman, I am sorry that I am not able to offer any criticism or ask any questions in regard to details of design of Diesel engine, as referred to in lecture. Being a mechanical man, the fact impresses me, however, that sometime sooner or later, machines of the kind illustrated will have to be repaired, and I therefore wish to ask a question or two in regard to this matter.

First. As to how far parts have been made interchangeable between each of the different units, and to what extent parts have been catalogued and piece-marked so that they can be readily ordered and kept in stock?

Second. Are repairs generally effected by renewing parts that have become worn, or is it the policy to repair them in kind, trueing up worn surfaces, etc., similar to the method used in repairing steam locomotives?

MR. DICKSON: The question of renewal parts is one that is very close to the engine user and the importance of it is apt to be overlooked by the engine designer. It demands that very concise records be kept of the different items that constitute the engine in order that requests for renewal parts can be expedited with minimum inconvenience to all concerned. In our line of engines which was described I brought out as a significant fact that identical parts were embodied in the different engines wherever the design would permit, such as cylinder heads, pistons, cylinder liners, fuel pumps and auxiliaries, etc.

As an example of attention paid in the designs to assist maintenance is the case of the shell bearing of the large end of the connecting rod. Many times in our earlier equipments train schedules were met by being able to change a bottom end bearing without removal of cylinder head and piston. It has the further advantage the maintenance force can keep on hand a spare shell compared to a connecting rod if the babbitt was bonded direct, and eliminates the inconvenience of returning the rod to the manufacturer for reboring on his jigs and fixtures. Does this answer your question?

PRESIDENT: Mr. H. D. Webster has had some experience along this line, I wonder if we might have a word from him.

MR. H. D. WEBSTER: I haven't had any experience with Diesel engines. The railroad with which I am connected operated, for a short time, two Diesel equipments, one a switching locomotive and the other a rail car, but our experience with them was so short that we did not get very much information. But I have been wondering while this Diesel development has been taking place whether we will some time move freight trains by means of Diesel engines. No claim has been made for that as yet that I have heard. Diesel locomotives are now in operation as switching locomotives and rail cars, and we have read, in the mechanical papers, of two stream line passenger trains that have recently been built that are propelled with Diesel engines, but we haven't heard anything yet in regard to moving freight traffic with Diesel locomotives, and the first cost of Diesel locomotives seems to be prohibitive in that respect, but possibly in ten or fifteen years from now it can be worked out so that the Diesel engine may be used in that service instead of the steam locomotive.

Quite a number of years ago Mr. Chauncy M. Depew said—I think it was at the time electric locomotives were beginning to be used in the New York City district, replacing steam locomotives in that zone,—that in ten years steam locomotives would be found only in museums. I think it was 30 or 35 years ago that he said that, and the steam locomotive today is doing better than ever, and the question is, when will the Diesel locomotive entirely supersede the steam locomotive.

MR. DICKSON: I purposely refrained from making reference to the application of Diesel engines to locomotives realizing this was a whole subject in itself and that you had previously had papers before the Club treating with this phase of the problem.

However, if we review the prospects of Diesel engines for main line work say in transfer service moving 5000 tons of freight at a good speed, you need every unit of horsepower you have in that steam locomotive, and you will need more than the equivalent in the Diesel engine. Compare this with switching service when the Disel electric locomotive will out-perform the steam locomotive of double the horsepower. The main line proposition is a horse of a different color.

I think the time is not far distant when by a multiplicity of units we will be asking your opinion for main line use. I recall an experience with locomotive 9000 of the Canadian National Railways, this is a double unit, 1330 hp. Diesel engine in each cab. We left Montreal on a fast schedule with over 100 press men on board and picked up the Mayors of the principal towns en route to Toronto where we arrived on time. This was being heralded as a new era in transportation. The 336 miles successfully completed I hesitate to say what another twenty miles might have brought forth with the press men on board when examination showed some of the babbitt of the connecting rod bearings sprayed over the crankcase doors. That was back in the early part of 1929, this is 1934 and we have learned a lot since then. The engines I have been describing tonight embody the lessons of that other day.

We are not in a position to say to you, here is the complete answer to the steam locomotive. We hope in the near future to have a more concrete picture of what it will be. You can rest assured if there is economic advantage to be gained in the way of motive power we will at the opportune time be submitting it to you for your consideration.

MR. A. J. MANSON: The gentleman who spoke just before raised a point on which I would like to comment. He spoke about the cost of the Diesel engine as being almost prohibitive. First cost is not the criterion. The cost in terms of performance is what must be considered. True your Diesel engine does cost considerable money, but the question is—what will the cost be over a period of time? That is the cost figure to consider—the ultimate in terms of the foot-pounds of work done.

Many applications for the Diesel locomotive, even at costs of $55,000 or $60,000 for the 70-ton unit, or $95,000 to $100,-000 for the 100-ton unit, will pay for that investment in three to four years, due to the high thermal efficiency and low cost of fuel. That is what you want to look at—not the first cost.

There is one point that Mr. Dickson did not bring out in his paper because he was telling you of the mechanics of the oil engine but which nevertheless is a very important factor in connection with these Diesel locomotives, and that is, the availability factor—availability meaning the number of hours in a given period of time the locomotive is ready for service. That is most important when you consider the balancing of this unit in a certain service against the steam unit to reach a conclusion as to whether you can afford to buy the oil electric locomotive at the higher price and get this economy and pay for the investment in three or four years. Take those rail cars Mr. Dickson spoke about—in the year 1933 the eleven rail cars operated 590,000 miles at an average availability factor of 83%. In the same year, the six 400 HP. locomotives with 9x12 engines operated 43,500 hours, with average availability of 93.8%. The five locomotives with 8¼x12 engines operated 38,700 hours, with an average availability factor of 93%. This very high availability is what offsets the high first cost and makes the oil electric locomotive economical in many, many applications.

PRESIDENT: Mr. William K. Stamets, have you any comment to make on the subject?

MR. WILLIAM K. STAMETS: I do not believe there is anything I can add to the discussion. I was very much interested in the Diesel engine from the standpoint of manufacturing as it appears to be an interesting job from a machine tool man's viewpoint. The question was raised regarding the replacement of parts, and it is my impression that it would be easier and less expensive than on steam locomotives.

PRESIDENT: May we hear from Mr. Verl E. McCoy, Mechanical Engineer, Wilson Engineering Corporation, Chicago, Ill.?

MR. VERL E. McCOY: I am a visitor in the city and am glad to have been given the opportunity to be here at this meeting. I got a lot out of this paper. Being an engineer and engaged in railway development work for the last ten years and viewing this development from an engineering standpoint, I certainly can appreciate what Mr. Dickson has been up against. He has presented the paper in a splendid manner. He is not too optimistic in his expectations as to what the Diesel engine can accomplish in the immediate future, but he is showing a good deal of commendable persistency in going ahead in spite of any past discouragements and I think that is a splendid thing.

PRESIDENT: May we have a word from Mr. Rufus Flinn?

MR. RUFUS FLINN: Mr. President, I have enjoyed very much listening to this paper and I think I know a little more about Diesel engines than I did before, though that is not very much. Several questions arose in my mind as I heard the paper, but I cannot present them now because Mr. Dickson has answered them all. I think we owe a debt of gratitude to Mr. Dickson and to the Westinghouse Electric and Manufacturing Company for this very fine presentation of a most interesting subject, and in recognition of that obligation I would move a rising vote of thanks.

The motion prevailed by unanimous rising vote.

PRESIDENT: If there is no further business, the meeting will stand adjourned. The usual luncheon is prepared in the rear of the room, to which you are all invited.

J. D. CONWAY, Secretary.

In Memoriam

JOHN P. BOURKE

Joined Club March 24, 1927

Died January 17, 1934

OFFICIAL PROCEEDINGS
RAILWAY CLUB OF PITTSBURGH
$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. FEB. 22, 1934. No. 4.

AVIATION FROM AN AIRMAN'S STANDPOINT

By CAPTAIN ALFORD JOSEPH WILLIAMS, JR.,
Manager, Aviation Sales, Gulf Refining Company, Pittsburgh, Pa.

OFFICIAL PROCEEDINGS
OF
The Railway Club of Pittsburgh

Organized October 18, 1901

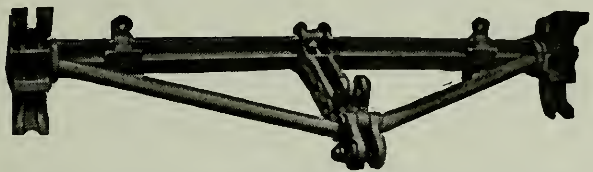
Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

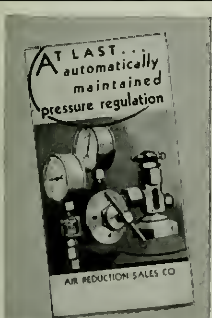
Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 4.

Pittsburgh, Pa., Feb. 22, 1934

$1.00 Per Year
25c Per Copy

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The Railway Club of Pittsburgh

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Vol. XXXIII No. 4. | Pittsburgh, Pa., Feb. 22, 1934 | $1.00 Per Year 25c Per Copy

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H. H. MAXFIELD........November, 1919, to October, 1920
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†—Resigned.
*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

FEBRUARY 22, 1934

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock, P. M., with President C. O. Dambach in the chair.

Attendance, as shown by registration cards collected at door, 174, as follows:

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Babcock, F. H.
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Barr, H. C.
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Borg, John E.
Bowden, F. S.
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Cotter, G. L.
Courtney, H.
Cunningham, J. D.
Cunningham, R. I.
Dalzell, W. E.
Dambach, C. O.
Davies, James
Davis, Charles S.
Derr, A. I.
Downes, D. F.
Durkin, James E.
Emery, E.
Fenton, H. H.
Ferguson, James H., Jr.
Ferguson, R. G.
Forsberg, R. P.
Frauenheim, A. M.
Furch, G. J.
Gatfield, Phillip
Gilg, Henry F.
Goda, P. H.
Hepburn, P. W.
Herrold, A. E.
Hilstrom, A. V.
Holmes, E. H.
Hoover, J. W.
Hughes, John E.
Johnson, William M.
Kentlein, John
Kirk, W. B.
Kroske, J. F.
Kruse, J. F. W.
Kummer, Joseph H.
Lanahan, Frank J.
Lanahan, J. S.
Leban, J. L.
Lee, L. A.
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Misner, George W.
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Morgan, Homer C.
Muir, R. Y.
McIntyre, R. C.
McKenzie, Edward F.
McKinley, John T.
McKinzie, E.
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Rutter, H. E.
Ryan, D. W.
Ryan, Frank J.

Schadt, A. D.
Schaffer, W. E.
Schrader, A. P.
Severn, A. B.
Shannon, David E.
Sheridan, T. F.
Simons, P.
Sixsmith, G. M.
Snitehurst, J. G.
Stevens, L. V.
Stoffregen, Louis E.
Stucki, A.
Sutherland, Lloyd
Trautman, H. J.
Trax, L. R.
Tucker, J. L.
Watt, Herbert J.
Weaver, W. Frank
Wikander, Oscar R.
Winslow, George W.
Winslow, S. H.
Woods, G. M.
Yarnall, Jesse

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Baldwin, A. V.
Balzer, C.
Barnhart, B. F.
Bell, Tobin
Blackshaw, J. L.
Brown, A. H.
Brown, S. M., Jr.
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McCreight, Don
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Tellis, Robert
Terkelson, Bernhard
Vogelsang, Hans
Walker, W. S.
Wallace, Charles
White, G. W.
Wikander, F.
Williams, Capt. A. J., Jr.
Wilson, W. S.

PRESIDENT: The call of the roll will be dispensed with, as we have a full record of the attendance on the registration cards.

If there is no objection, we will dispense with the reading of the minutes of the last meeting, as the minutes are in the hands of the printer and will be mailed to you shortly.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Barnhart, B. F., Road Foreman of Engines, B. & L. E. R. R., 9 Shady Avenue, Greenville, Pa. Recommended by William M. Johnson.

Ingold, C. F., Resident Manager, North American Coal Corporation, 826 Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Menaglia, Victor A., District Sales Manager, S K F Industries, Grant Building, Pittsburgh, Pa. Recommended by R. H. Flinn.

PRESIDENT: In accordance with our By-laws these proposals will be referred to the Executive Committee, and upon approval by that Committee the applicants will become members without further action of the Club.

Are there any communications or announcements?

SECRETARY: Since our last meeting we have received information of the death of two of our members, Jacob C. Coleman (Retired), Union Railroad, died July 10, 1933, and John T. Ferrick, Freight Cashier, P. & L. E. R. R., died February 2, 1934.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings.

If there is no further business, we come to the address of the evening. I will ask Mr. Lanahan to introduce the speaker.

MR. FRANK J. LANAHAN: Mr. Williams just said to me as I got up, "Go Easy." It is well he did, or undoubtedly I would have requisitioned superlatives in speaking of this aviation hero. Captain Williams is known to practically every man here, at least by reputation. His achievements in the air have gained for him recognition among flyers, and when speed and daring are discussed, you will always hear Al Williams' name mentioned. Many records for speed have been held by him and many are the improvements attributed to this genial fellow on equipment for aeroplanes. His contributions have been recognized as going a long way towards bringing aviation to its present state of perfection..

It may be surprising to some of you younger fellows here tonight, that not only in aviation did Captain Williams distinguish himself, but he was a big league ball player, a pitcher, in fact, and not on any scrub team either, but played with the Giants under John McGraw. To further illustrate his versatility, he is a graduate of Georgetown Law School; is an author and a frequent contributor to current publications. More recently he has identified himself with commercial life and most modernistic in his ways and means of stimulating and sustaining public interest in the products he has espoused. We may lay claim to him as a fellow Pittsburgher, for he is now associated with the Gulf Oil Corporation. I think he brings to that company honor with his unique talents. Characteristic is it of us Americans to indulge in hero worship; we have a tendency to unstintingly recognize outstanding deeds of valor and pay compliment to the performer, and despite the protests or objections of our designated hero, we insist on placing him on a pedestal. With that mental picture before you, let me present, Captain Al Williams.

AVIATION FROM AN AIRMAN'S STANDPOINT

By CAPTAIN ALFORD JOSEPH WILLIAMS, JR.,
Manager Aviation Sales, Gulf Refining Company, Pittsburgh, Pa.

Good evening. It is a very lucky thing I warned Frank before he came up here, for with that introduction, what would he have said without it.

Recognizing as I do that we are all interested in a great industry, that you as well as I are interested in the newer devices for safety in flying, I thought I would come here tonight and discuss a theory that we in the Gulf Refining Company are giving deep study to, the theory of lubrication and the study of the principles of lubrication as applied to airplane practice, and that you as technical men would be highly interested in that sort of a discussion. Well I am not going to talk about anything of that sort at all.

Speaking about the weather, I tried to get my assistant, Mr. Ralph Lockwood, to come here with me this evening but he had four excuses and every one of them was good.

(Blue prints, slide rule, etc.)

When the job is finished and we get the equipment in the field and ready to work, we come down to the most interesting part of the whole apparatus, human people. I could talk indefinitely about that. I like to be in this audience. I haven't been in a place like this in a long time. My last experience I faced a lot of darn fool things looking at me these "mikes."

That is why I am at perfect ease tonight. Do you know that since 1921 or -22 we have had no association, no concerted effort, but there was an unspoken slogan to go out and break down this idea as to super-men in aviation, and we have been kicking that into a campaign ever since. In the last thirty years we have seen mechanical developments make their appearance, inventions, we have heard them talk, the telephone and the radio—we have seen things that should have taken about 300 years to develop done in the space of seconds. And we are lucky to be sitting here and watching these things. The world will forget every one of us except Edison and a few of the outstanding men of genius, but they will never forget this age, not for the next two or three hundred years.

Coming back a moment, for twenty centuries or more we have been reveling in the thought of getting off the ground. When we thought of going to a certain destination it meant going as a bird went, forgetting that we have any such things as swamps, rivers or mountains. It was the highest he could hope to attain and still remain on the earth. And finally we stumbled on flying. It has been our job to sell this conquest to human beings, this conquest of the air, but one of the hardest jobs is to get rid of the lurid atmosphere that surrounds this business of flying.

I have told you over the radio about what we see coming. The only trouble with human beings is that the wonders of our age mark the apex of human accomplishment. All we need to do is to go back and see how short sighted that is. I try to sell the idea to everybody that we are going to live to see the time when thousands and millions of airplanes will be in everyday use. People do not know that it is possible to build airplanes that will not spin, that will require the minimum amount of attention, that can be taken off from 30 miles an hour. Those are directly ahead of us. The information has not gotten out yet. We will soon see it in these little flivver airplanes. We want to break down this super-man idea. I remember my long service in the navy, thirteen years. We just had to be on the spot every moment. I have still a vivid memory in my mind of some of those old fellows sitting over me, saying "Do these things, do not do those things." That was the atmosphere we passed through. If any of us went back and told you the truth about how we felt and what we did with the equipment we had you would get rid of this hero idea. There was no such thing as psychology back in 1917. They never worried about what we were thinking about. When you went to a plane for your first solo after you had had one or two or three hours instruction, they never thought about your feelings. I was as scared as the dickens but nobody knew it. You may be smoking. You just fleck off the ashes and pay no attention. We see a car start out. What is that fellow carrying? Two doctors, two hospital men and two stretchers. I shall never forget my first solo, we didn't know anything about it. Two hours instruction! We heard the doctors talk: "Wonder whether that fellow will make a landing." None of us knew where we were going. They were happy days. An organization may sit smugly and perfectly satisfied with everything. You have got to go and stir them up. We complained about our chow. We had reason to in those days. Thinking of the great things we were going to do. Going out for your first flying a few minutes before sunrise. You are soon coming up out of the water. The world is clean and it is a new day. Comfortably you can look around. I see smoke coming up from the chimney. I could smell that grand coffee that belongs to palatial homes but not to the navy. One morning I managed to have a forced landing close to one of those homes. I told a friend of mine about it. I may have expedited it a little by pulling off the wires from two spark plugs. I taxied up to the house and asked if I might telephone. We were thinking that if we asked to use the telephone sometime about breakfast time we might be invited to stay and have some coffee. I discovered that I could not put an "exclusive" on it. I had some good friends and I told two or three of them and one of them inadvertently told it to a friend who immediately spread the good news all over the station. First thing you knew we had more forced landings than you could keep track of, until there came the only order that could be enforced against forced landings: "It will be held an evidence of bad faith and bad judgment if there is any forced landing south and east" of a particular point.

The days some how do go on. I can remember one definitely. I get as much fun out of thinking of those days and talking about them. We had a lot of fun. It did not look like fun then because it was serious and we did not know what the consequences would be. We took it a little too seriously. Some how or other it has been a part of every flying man's life when he looks back on those days when he begins to grow older. Those experiences help us a great deal in guiding the people who come later on. With all the sport and amusement, we had to do our own thinking. There is a lot of romance in flying. And looking at this from the back ground I have told you about, I am hoping for the time when more and more people will be flying. A generation is coming that will see the light more than we do. It is a psychological time and the United States is going to fly more and more, because we are flying by reason of a rather recent conquest of mankind.

I recently sold an article to a magazine. They had a man whose main job was to keep a finger on the pulse of society. The article had some rather technical information in it and the people told me that would not be understood. "Are you going to throw the story out?" It was too technical. I said "Will you bring in that young fellow who asked me to autograph his model plane." He came in with the precious result of his labor and I said to him "Son, what is the wing curve of that right wing?" "17.37." "What is the dihedral?" "What is the stagger?" "29% of the mean courses." The fellow said to me "Do you know what he is talking about?" Which is a practical evidence that we are all tremendously interested in what is going on down in Washington. We just still have the hope—thinking that the air lines will be generally shut down. Of course they will not shut down. Things like that don't happen. I have heard people say in the last three years that the United States would pull out. Well suppose we did, what then? There would be the damndest exodus from Europe to take over the business that your eyes ever saw. They are not going to shut down. The present administration acts with publicity agents and radio to attain the same ends in another direction and keep us interested. If they would only tell us what they are thinking out we might accept them.

Look at these air lines today. Do you realize that they have been in operation only about eight years? Have you any idea what cross country flying meant eight years ago? The only time we were permitted to find out what the weather was at a destination was when we were carrying an admiral. A straight pilot was never called on to find out whether he could bring a $20,000 airplane from one place to another. We did not know local conditions. He was not interested in local conditions. He was not local himself. Local weather was only of incidental interest. Those were much different days. We had compasses. We took them off boats and put them on. The needle would wobble around from side to side but it was supposed to point in the general direction of the points of the compass. We had compasses so sensitive that if you started to adjust for bumps in the air it left you in excellent condition to find out where you were going! It was a pretty tough operation to be flying around and your own judge of conditions to find out whether you had guts enough to turn around and go home. And that takes lots more guts than to go on through. You generally meet more people who would have gone on. You know the fellows. I never will forget in 1921 I wanted to get home pretty bad. I flew out about twenty miles and the ceiling kept getting lower and lower, coming right down on top of the trees. I had sailed that road time and again but never under 200′. I kept on poking along. It got down to about 50′ of the trees. I couldn't do it. I had 200 miles more to go. I turned around and went back to the station. No sooner had I landed and ready to leave the station when a whole flock of air planes started to come in from New York. Everybody knew that I had turned around and come back. I learned later that only eight or ten miles beyond where I had turned around there was unlimited visibility up to 10,000′. The only difference was I didn't know it. Take the air man today going cross country. The pilot today in the cock pit wants to go from Pittsburgh to Cleveland. He uses his compass to trace the general direction. He gets a signal "On Course". If he veers to the right he gets a signal; to the left he gets another signal. There is nothing for him to think about. There is a new instrument that will regain his course and hold him on it. They don't carry maps any longer. We never ventured away from home without carrying a detail map of the terrain. Those fellows are just sitting there miles away from everybody. All of a sudden a human voice comes in and you are 10,000′ up, and that voice tells you that the weather is so and so, and visibility so and so, and the direction of the wind so and so, etc. It is an uncanny experience to be sitting there in a different planet all by yourself.

Then the blind flying instruments. Direction is only one.

We may be sure that we are on the course. We know how to keep the ship level. We have an artificial horizon which gives us through visual indications on the instrument where the horizon is all the time. Blind flying instruments are not available in the army. That makes me feel bad when I think of army airmen flying the mails. And a lot of other fellows. Somebody is going to get hurt tonight. Somebody did get hurt. I do not know what the purposes of the administration are. I would like to know but it is either unwittingly going to concentrate public attention upon the condition of our national air defense. And mark my words there is going to be a committee constituted in Washington to review this situation and I do not know what the result will be. Other nations are beginning to consolidate their air forces into a single department. I don't know what the results will be. I am wondering where the navy is during this national emergency. As I said once before over the radio if this is a sample of what we are going to get, if some nation should come here with a fighting air force we would be in the same position as the British at the Dardanelles. They never got through because they were continually bickering about which contingent was going to take hill 32 and the Turks got there ahead of them and the British never did get through. Are we going to repeat the same situation when it comes to an air defense against somebody coming in here?

I made a note of some of my early experiences.

(Pure pronunciation over radio criticized)

It held me up one time because I could not speak German. I had spent all my life in Chesapeake Bay. I was sent up to Philadelphia to bring down an Austrian plane. After the war they made a practice of buying up samples of those foreign fighting planes. We took all the gadgets they had developed and brought them over here to study. I asked the fellow who had been rigging this and he said the way the valves are set, don't touch them. I took off like an ordinary flying boat. I was alone because there was only room for one, a sort of form-fitting air plane. I was flying over my old stamping ground. Nobody there to watch us. I finally got down opposite the Rappahannock River. The motor began to spit. Just the same as in the Liberty engines. It finally stopped and down we went and I put it in the water about 25 miles off shore. It was getting late in the evening. There was a long list of names behind me and I turned around and looked at those Austrian names. I fiddled with them all. We sat there all night long all alone. That was the most lonesome feeling I ever knew, sitting out there in the water in this little laminated wood boat. In the morning out came the flock looking for me. Do you know how hard it is to find something from the air. They came up and found me and somebody had sense enough to bring a fellow named Kaiser up. Here was a fellow that could talk the boat's language. I said, "What is the matter with it?" He turned four or five gadgets and pumped from one tank into another and we finally started up and went home. But I shall never forget how lonesome I was out there.

I put down another note. Here was those famous engines that carried Lindbergh over the ocean. We knew those engines well when they were first tentatively suggested to the navy. The first of those Wright Whirlwinds we had to deliver at Anacostia in Washington and put it in a little single seater. I took it up and had a grand time. I never had flown a radial engine in my life. The old engines we were familiar with at that time, the Curtis D 12, the Liberties, reached a point of some usefulness in 1921. This radial was taken up and it began to dance around in the air. There is one thing you must say about aviation, the days you are flying you want to stay awake all day long. It was my first experience attempting to meet forces already in existence; to bring something into being to stop that force was out of the question. I had my hand on the throttle, I was shutting down a little bit. There was a snap and I heard something grind. I jammed the throttle quickly and it set up a terrific howl like a saw mill. We had no power from thereon. I went down in a glide and we finally got down and still I did not know what was the matter. I went around in front of the ship and had the surprise of my life. I rubbed my eyes and looked again. The prop was gone. The whole crank shaft had sheared off at the crank case.

That brings my mind back to Washington. It was supposed to save time to get you where you want to go. I remember one instance where I used it to get away from people I did not want to meet—that august body called Congress. I had a tip from a friend of mine during the Mitchell episode in Washington that I was going to be called before that Commission. I had no desire to go up there and whatever I said would be wrong from somebody's standpoint. There was no such thing as safety before that gang. I went down to see my commanding officer and he knew I did not want to be called. I took this airplane and sailed for parts unknown. I went to

Richmond and stopped to see a friend. I was just sitting down to lunch when a telephone rang. I got the funniest message I ever received. "Is this Lieutenant Williams?" "Yes, sir." "This is a Committee of the House of Congress. Report immediately." There is nothing these fellows can't do. How they caught me there I do not know. Nobody knew where I was going.

During the war we had forest green uniforms. That was contrary to sea-going regulations. Being a self-determining group, we determined that we were going to wear those forest green uniforms. . . . You couldn't do that with a blue uniform. I landed in Washington. I had been told to report immediately. I flew up there and went in to town in the official car. I never changed my uniform but went right up to the Congress. An old fellow started to get gay. "Back up," he said, "you are heading right straight into trouble." He said, "Lieutenant, you may dispense with that uniform and make yourself a little more comfortable." I said, "I am sorry but I can't." "Why not?" "I haven't got anything on underneath," which, of course, gave me the best opportunity to express why we needed a certain type of uniform in the navy department, and we got that uniform.

I have been going on too long.

We were setting a radio equipment aboard the Curtis, a two-way radio set, getting it fixed so we could do some acrobatics. We had a little Curtis powered with about 600 h.p. We put the radio down to the ground and talked to the crowd. We carried on a little conversation while we were going in. Let me give you this warning, if you are up in the air with one of those gadgets be very, very careful. I haven't said anything here tonight that I could not say outside. But we had an experience when we were testing out the set one morning. I had a radio expert with me and in view of the fact that we had only about ten minutes, I wanted to get the test over so we could put on a good show in the afternoon. He had a book of the entire regulations and he began reading these long regulations. I was flying up side down trying to adjust the microphone at the proper distance to get the best reception on the ground and the fellow was still reading. I finally yelled at him, "darn you, can't you do what you are told?" The next morning I saw a policeman coming toward me. He says, "Are you Lieutenant Williams?" I says, "Yes, sir." "Well," he says," "I have to do a little investigating. Yesterday I was cruising along and I heard the funniest remark bounce out of my receiver I ever heard." "What was that," I said? He said, "I was going along minding my own business and all of a sudden I heard a short, sharp voice come out and say, "darn you, can't you do what you are told?"

It is nice to be with you tonight.

PRESIDENT: We are fortunate in having with us tonight Captain Williams. He said he would stay with us long enough to answer any questions you might wish to ask, so I hope you will avail yourself of this opportunity to find out something about this new form of transportation.

We have with us Mr. Gatfield, of the Keystone Sand Company. We would be pleased to hear from Mr. Gatfield.

MR. PHILIP I. GATFIELD: Mr. President, I am a pretty young member of this Club. I want to say how much I appreciate Captain Williams' talk. I must tell him that I was a little disappointed though. I came here tonight thinking he would give us a little information about the flivver plane. I heard him talk about that over the radio and I thought he might have something to say about it.

CAPTAIN WILLLIAMS: We had some sea planes delivered to us, a fighting ship with finely finished surface. Now you are not supposed to make any changes in the structure of equipment or anything else without getting the proper papers sent up. I decided that since I was the test pilot, under the circumstances I would take it upon myself to take the ship out of the water and put it on the beach. We threw some sand on top of the pontoon and some of the sand stuck and we immediately put another coat on top of that, with the result that that slippery finish was taken care of.

PRESIDENT: We have a number of boys here tonight and I am going to call on Mr. William K. Harper to introduce them.

MR. LANAHAN: There are quite a number of them back there, good, bright, husky fellows, and we would like to have them stand up and introduce themselves.

(Five student juniors stood up and were identified.)

PRESIDENT: Have you any questions you would like to ask Captain Williams? If not, may we hear from Mr. Emery.

MR. E. EMERY: Captain Williams, you suggested something I would like to have you speak of further, the difficulty of picking out objects on the ground from the air.

CAPTAIN WILLIAMS: I was speaking about the difficulty in picking things out when you are in the air. It is surprising what a difference in the appearance of the terrain is made by a difference of only a few hundred feet in elevation. One reason why we want these flivver planes is to get as many people in the air as possible. I do not know whether we shall have another war or not. I think the principal nations of Europe will be able to settle their differences as they have almost always in the past. But every nation in the world today except ours is interested in getting its people air minded.

You would be surprised to know what colors mean to an air man. Every single color in the landscape means something. An entire field of what has a distinctive color. Difference in color will tell you the low spots in the field. A dark streak in a field is a low spot. That is the drainage point. It has more moisture in it. That tells a story you want to know.

Speaking about the difficulty of finding things from the air, I have been lost at sea and I have had people flying over 2,000′ and I wondered how men could get off the water. It is a matter of avenues of approach on the ground. The moment you leave the ground you have left those roads. I saw 25 army and navy ships scattered all around Washington to meet that French flier who was coming up from the direction of Norfolk, which meant up the Potomac River, and they flew around waiting for this single airplane to appear, every one of those men in a pursuit plane, as good as we had available. I saw that Frenchman come within five miles of Washington and not one of those 25 planes had seen it. When we sighted him we hoped to get in to Washington in time to prevent people from knowing it.

It is very interesting to check back on the little things that mean so much. There are few big things in life and of the big things you have very little to say about it. It is the little things that go to make up a success. And in airplane flying it is not the big things, it is the dust that may be coming up from an automobile. You have no indication of wind direction, which you must know at all times. You can see a little dust circling from the back of the automobile. That is air vision, and it is the map which you can see under certain conditions and which you cannot see under other perfectly plain conditions. Another way to test what air vision means, if you are used to going over a course at a safe elevation of 3,000′ you get a certain picture. But go down 200′ and try to get home. The colors are changed and the perspective and all that goes to make up air vision.

MR. HENRY F. GILG: I want to ask about clouds, whether you notice any difference above the clouds from what we see from the surface of the earth.

CAPTAIN WILLIAMS: Yes, indeed. I am not always dreaming but you cannot help dreaming when you see those pictures. It is the greatest dream in the world to try to picture what fairy land must be like. Nobody has seen that until they have gone up above a thick cloud and then look down. It is a great mountain of steam piled up. There is a valley and you dive out and down and try to climb the valley. There is nothinfi on earth like it.

MR. GILG: I had a very limited experience. I was up once 14,000′ crossing the mountains going into Mexico City and I saw those cloud formations looking like half a sphere, many of them, and breaks in the clouds looking intensely blue. I wondered whether you ever saw anything of that kind.

CAPTAIN WILLIAMS: Yes, sir, I have been knocking around among them for years. They are not confined to any part of the world, you find them everywhere. To find how small you are, go up to a place like that and look down. It would be a good idea to get ten thousand "executives" and take them up 10,000′ and give them a grand idea of just what they amount to.

PRESIDENT: Mr. W. P. Buffington, of the Pittsburgh Coal Company, have you anything to add to the discussion?

MR. W. P. BUFFINGTON: "We have heard many discussions in the past few years that were good and a few weeks ago I had the pleasure of hearing Captains Hawks. Am sorry that more of our members are not here to hear Captain Williams as I have discovered that both of these gentlemen cannot only fly, but talk as well."

PRESIDENT: May we hear from Mr. R. P. Forsberg.

MR. R. P. FORSBERG: The Captain's description this evening of a portion of the territory in Southern Virginia, where some of his flying was done, is also a decription of the green fields and fertile acres where my boyhood and young manhood days were spent. One day down in my Southern home two old Negroes were seated side by side on the bank of a small stream, beneath the shade of a large sycamore tree, smoking their pipes and fishing in silence. Finally one of the company of two turned to his companion and said: "Ephraim, ef you had de privilege of namin' all of de good things dere is to eat in de whole wide world, what would you name?" The question was a stupendous one, but Ephraim, after scratching his kinky head for a period of about three minutes' duration, said: "Well, Sambo, ef I had de privilege of naming all of de good things dere is to eat in de whole wide world dis here is what I'd name. I'd name ole possum and I'd name sweet pertaters and I'd name watermelon and dats all I'd name, Sambo, dats all I'd name." "And now, Sambo," said Ephraim, "ef you had de privilege of namin' all of de good things dere is to eat in de whole world what would you name?" Sambo thought for a moment and then said in a rather sullen manner: "Well, fore de good Lawd you aint done lef me nuthin' for to name."

And so, Mr. Dambach, when you ask me to say something this evening relative to aviation, after listening to this most interesting and instructive talk of Captain Williams, I feel like resorting to the expedient of old Sambo and saying the Captain "Aint done lef me nuthin' for to name."

I can, however, say that since I have been a member of this Club I have heard no speaker convey to his audience, from start to finish, the essence of his talk in clearer terms and a more graphic manner than Captain Williams has done this evening. In fact, at one time I found my head swimming a little as we were flying upside down.

Thanks to the Captain for talking to us in our own language, we will leave this evening with a broader conception of aviation than we before have entertained.

Mr. Chairman, I move by a rising vote that we tender to Captain Williams our sincere thanks and appreciation for the entertaining and instructive talk on aviation he has just given us.

MR. LANAHAN: I would like to second that motion. We all know and revere that great character whose portrait hangs over the speakers' table, George Washington, who is truly described as "First in War, First in Peace and First in the Hearts of his Countrymen." Somehow we are prone to think that all the distinguished personages and, as a matter of fact, all the great men were in the years gone by. I believe we have had tonight very well demonstrated that the heroes of other days are not the only ones. We have monuments commemorating fellow citizens who were heroes in the days gone by, so, may I say in the days to come you will travel back in your minds and tell the younger generations of this evening and the great aviator it was your privilege to hear. I am a firm believer that

> Lives of all great men remind us
>   We can make our lives sublime,
> And departing leave behind us
>   Footprints on the sands of time.

Well, Al Williams certainly has left his footprints and they will be seen by generations yet unborn, and we have had a rare privilege tonight to listen to this quite modest gentleman. I am glad to second the motion for a rising vote of thanks.

The motion prevailed by unanimous rising vote.

There being no further business the meeting was duly adjourned.

J. D. CONWAY, Secretary.

In Memoriam

JACOB C. COLEMAN

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Died July 10, 1933

JOHN T. FERRICK

Joined Club March 25, 1926

Died February 2, 1934

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OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 5.

Pittsburgh, Pa., Mar. 22, 1934

$1.00 Per Year
25c Per Copy

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DONALD O. MOORE, Mgr., Traffic Div., Pittsburgh Chamber of Commerce, Pgh., Pa.
A. B. SEVERN, Sales Engineer, A. Stucki Co., 419 Oliver Bldg., Pittsburgh, Pa.
W. P. BUFFINGTON, Traffic Manager, Pittsburgh Coal Company, Pittsburgh, Pa.
JOSEPH H. KUMMER, Gen. Sales Rep., Fort Pitt Malleable Iron Co., Pittsburgh, Pa.

PAST PRESIDENTS:

*J. H. McCONNELL.....October, 1901, to October, 1903
*L. H. TURNER.....November, 1903, to October, 1905
F. H. STARK.....November, 1905, to October, 1907
*H. W. WATTS.....November, 1907, to April, 1908
*D. J. REDDING.....November, 1908, to October, 1910
*F. R. McFEATTERS.....November, 1910, to October, 1912
†A. G. MITCHELL.....November, 1912, to October, 1914
*F. M. McNULTY.....November, 1914, to October, 1916
J. G. CODE.....November, 1916, to October, 1917
*D. M. HOWE.....November, 1917, to October, 1918
*J. A. SPIELMAN.....November, 1918, to October, 1919
H. H. MAXFIELD.....November, 1919, to October, 1920
FRANK J. LANAHAN.....November, 1920, to October, 1921
SAMUEL LYNN.....November, 1921, to October, 1922
D. F. CRAWFORD.....November, 1922, to October, 1923
GEO. D. OGDEN.....November, 1923, to October, 1924
A. STUCKI.....November, 1924, to October, 1925
F. G. MINNICK.....November, 1925, to October, 1926
G. W. WILDIN.....November, 1926, to October, 1927
E. J. DEVANS.....November, 1927, to October, 1928
W. S. McABEE.....November, 1928, to October, 1929
E. W. SMITH.....November, 1929, to October, 1930
LOUIS E. ENDSLEY.....November, 1930, to October, 1931
JOHN E. HUGHES.....November, 1931, to October, 1932
F. I. SNYDER.....November, 1932, to October, 1933

†—Resigned.
*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

MARCH 22, 1934

The meeting was called to order at 8 o'clock, P. M., at the Fort Pitt Hotel with President C. O. Dambach in the chair.

Attendance, as shown by registration cards collected at door, 202, as follows:

MEMBERS

Allen, Harvey
Allison, John
Ambrose, W. F.
Anderson, Burt T.
Bailey, J. C.
Balzer, C. E.
Barnhart, B. F.
Barr, H. C.
Beam, E. J.
Beaver, R. C.
Berg, Karl
Berghane, A. L.
Boggs, L. S.
Bone, H. L.
Britt, T. E.
Brown, E. L.
Buffington, W. P.
Burgham, M. L.
Callahan, F. J.
Cannon, T. E.
Carlson, L. E.
Carr, T. W.
Carruthers, G. R.
Chaffin, H. B.
Christy, F. X.
Church, S. L.
Conway, J. D.
Courtney, H.
Cunningham, R. I.
Dambach, C. O.
Davis, Charles S.
Dickinson, T. R.
Downes, D. F.
Emery, E.
En Dean, J. F.
Endsley, Prof. Louis E.
Ferguson, James H.
Freshwater, F. H.
Fults, J. H.
Gardner, George R.
Gatfield, Phillip
Gillespie, J. Porter
Glaser, J. P.
Glenn, J. H.
Goda, P. H.
Grieve, R. E.
Guinnip, M. S.
Haller, Nelson M.
Hansen, William C.
Harper, J. T.
Hepburn, P. W.
Herrold, A. E.
Hilstrom, A. V.
Honsberger, G. W.
Huff, A. B.
Hughes, John E.
Johnson, William M.
Kentlein, John
Kirk, W. B.
Kirsch, O. W.
Kramer, William F.
Kraus, Raymond E.
Kroske, J. F.
Kruse, J. F. W.
Lanahan, J. S.
Leet, C. S.
Lynn, Samuel
Maliphant, C. W.
Mayer, L. I.
Millar, C. W.
Miller, John
Mills, C. C.
Misner, George W.
Mitchell, W. S.
Morgan, Homer C.
Murray, Stewart
Mussey, D. S.
McGeary, E. J.
McIntyre, R. C.
McKee, F. C.

McKinley, John T.
McMullen, Clark E.
Orbin, Joseph N.
O'Sullivan, J. J.
Palmer, E. A.
Pringle, H. C.
Purchard, Paul
Queer, Thomas H.
Renshaw, W. B.
Reymer, C. H.
Richardson, E. F.
Rizzo, C. M.
Ryan, D. W.
Ryan, Frank J.
Schadt, A. D.
Schaffer, W. E.
Schenck, S. B.
Schmitt, Raymond F.
Severn, A. B.
Sheets, H. E.
Smith, J. Frank
Smith, R. P.
Snyder, F. I.
Stamm, Bruce B.
Stein, J. A.
Stevens, L. V.
Stoffregen, Louis E.
Storer, N. W.
Sullivan, P. W.
Sutherland, Lloyd
Thomas, George P.
Thomas, T.
Trax, L. R.
Triem, W. R.
Tuttle, C. L.
Van Blarcom, W. C.
Vollmer, Karl L.
Weaver, W. Frank
Webster, H. D.
West, Troy
Wheeler, C. M.
Wilharm, J. H.
Woods, G. M.
Woodward, R.
Wright, John B.
Wurts, T. C.
Wynne, F. E.
Yarnall, Jesse

VISITORS

Archer, W. J.
Atwell, C. A.
Barber, W. H.
Baughman, G. W.
Bechtold, Robert K.
Boggs, Jack M.
Brown, A. N.
Buffington, W. P., Jr.
Cherry, Herbert A.
Cooper, S. B.
Cotter, C. S.
Crombie, C. R.
Dahlinger, A. C.
Davis, William B.
Dickson, K. B.
Donaghy, Sloane
Drass, C. Edward
Eaton, T. O.
Eichner, John
Elasko, A.
Farquhar, R. P.
Fite, C. A.
Fox, J. O.
Friend, E. F.
Frisch, M. F.
Gemmell, R. W.
Ghezzi, W. B.
Hamilton, R. F.
Harper, William H.
Hart, William J.
Hoerner, A. S.
Hofmann, E. L.
Jados, W. S.
Jenkins, H. Wesley
Kaneine, Louis F.
Kelin, A. W.
King, William R.
Kintzing, R. T.
Krape, R. D.
Lail, G. G.
Lewis, S. B.
Lintner, A. R.
Lintner, G. E.
Maloney, J.
Miller, Bernard B.
Moles, William G.
Mowry, John W.
McCormick, A. W.

McTighe, B. J.	Snodgrass, T. R.
Olsson, F. J.	Stevenson, L. N.
Orwig, C. E.	Terkelson, B.
Pennington, F. W.	Tripp, W. N.
Rensch, R. H.	Tully, R. Harry, Jr.
Rigatti, Gus	Turner, A. G.
Riggs, Charles H.	Undercoffer, R. H.
Saylor, Wilbur A.	Varsany, John
Schramm, M.	Veltri, Peter
Severn, John	Vollmer, Paul F.
Sharp, James	Welty, E. M.
Smith, G. F.	Wheatley, Albert R.
Smith, Sion B.	Worden, L. F.

Prior to the business session a delightful musical program was presented by the Carnegie Steel Company Male Chorus under the direction of Mr. R. Harry Tully, Jr., Mr. Marty Schramm, Accompanist.

At the close of the musical program, upon motion of Past President Mr. Samuel Lynn, the appreciation and thanks of the Club were expressed by unanimous rising vote.

PRESIDENT: If you will come to order we will proceed with the business meeting.

As usual, the calling of the roll will be dispensed with as we have a full record of attendance on the registration cards.

If there is no objection we will dispense with the reading of ths minutes of the last meeting. There has been some delay in getting the revised copy from the speaker at that meeting, but the Proceedings will reach you very shortly, I am sure.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Clardy, W. J., Railway Engineer, Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by G. W. Honsberger.

Gemmell, R. W., Railway Engineer, Westinghouse Electric & Manufacturing Company, 6744 Penn Avenue, Pittsburgh, Pa. Recommended by G. W. Honsberger.

Rensch, R. H., Sales Engineer, General Electric Company, 3418 Meadowcroft Avenue, Mt. Lebanon, Pittsburgh, Pa. Recommended by J. D. Conway.

PRESIDENT: In accordance with the provisions of our

By-laws these proposals will be referred to the Executive Committee and upon approval by that Committee the gentlemen will become members without further action by the Club.

Are there any announcements?

SECRETARY: I regret exceedingly to announce the burial this morning of one of our members whom I am sure the majority of you will recall, Mr. Joseph H. Kummer. He was Chairman of our Entertainment Committee last year and a member of our Membership Committee this year. His death occured in New York City. He was on duty at the door of our Club almost every meeting, the first to greet you as you entered. He joined the Club March 26, 1915.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings. It was a distinct shock to all of us to hear of his death. He was the first to meet us as we came into the room and the last to bid us goodbye as we left.

Is there any further business? If not we will proceed to the address of the evening. We have with us tonight Mr. R. D. Krape, Engineering Section, Transportation Department, Erie Works of the General Electric Company, who will address the Club on the subject, "The Oil-Electric Locomotive and Its Application to Yard Switching." We have had several papers in recent years on the oil-electric locomotive, but former speakers took in a little more territory, which brought about a lot of discussion. The present speaker has confined his discussion to yard operation. I have very great pleasure in introducing to you Mr. Krape.

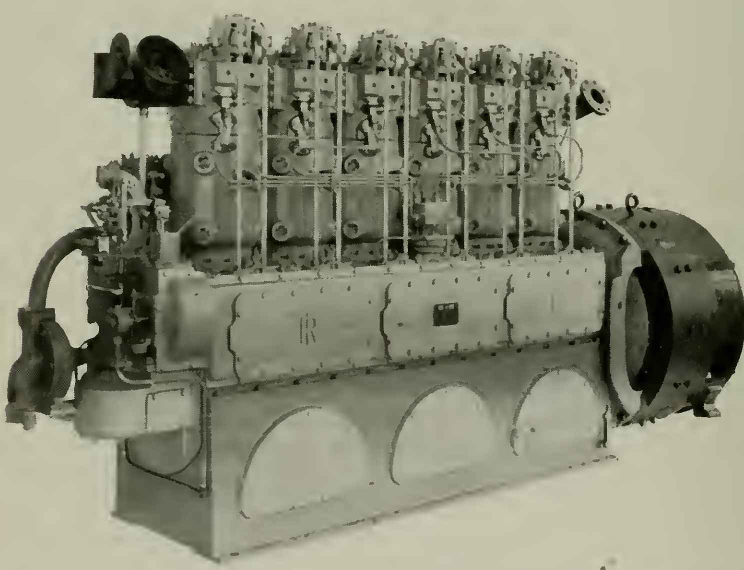
Diesel Electric Locomotives and Their Application

By R. D. KRAPE, Transportation Engineering Department, Erie Works, General Electric Company, Erie, Pa.

There are now in operation in the United States and Canada 140 Diesel electric locomotives. Of these 105 are in railroad yards, the balance in industrial plants. These locomotives have an aggregate of approximately 65,000 H.P. The New York Central system leads with 44 locomotives; the Delaware, Lackawanna & Western is second with 16; the remaining are held in lots of from 1 to 6 by 29 different railroads. With the exception of the 2600 H.P. Canadian National Railways locomotive all those so far built have been for switching service.

Although the total number of locomotives in operation in foreign countries is less than in the United States, the last few years have seen increasing activity along this line, especially in Europe. The high cost of fuel and scarcity of water during dry seasons in tropical climates has prompted a number of roads in the Far East to try out the Diesel electric locomotive in an attempt to get something cheaper to operate than their present steam engines.

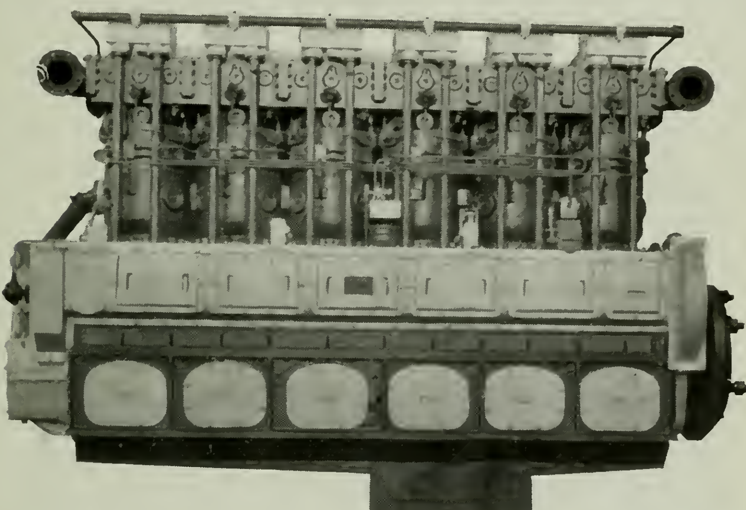
During 1933, 12 locomotives aggregating 24,000 H.P. were built in Europe. These included switching locomotives ranging from 200 to 500 H.P. and road locomotives from 900 to 1700 H.P. Due, no doubt, to the lighter weights of trains common



400 HP Ingersoll-Rand Diesel Engine with General Electric Generator.

in foreign countries, the railroads have been paying more attention to road service than have the railroads of our own country. Interesting examples of foreign application of Diesel power are the 1500 H.P. Diesel freight locomotive and the six 1000 H.P. Diesel passenger locomotives on the Siamese State Railways; a 900 H.P. passenger locomotive on the PLM Railway of France and three 1700 H.P. passenger units for the Buenos Aires Great Southern Railway of Argentine.

It has been the steady improvement of the engines that has made the Diesel electric locomotive possible. The use of internal combustion engines for railway service really started in 1925 by the introduction of a 60-ton switching locomotive powered by a 300 H.P. Diesel engine. This locomotive weighed about 60 tons with the Diesel engine weighing about 67 lbs. per horsepower. By the use of higher speeds and lighter metals the weight per horsepower of Diesel engines has been gradually reduced until at the present time engines are available for locomotive service weighing as low as 20 lbs per horsepower and running from 700 to 900 RPM. For switching locomotives

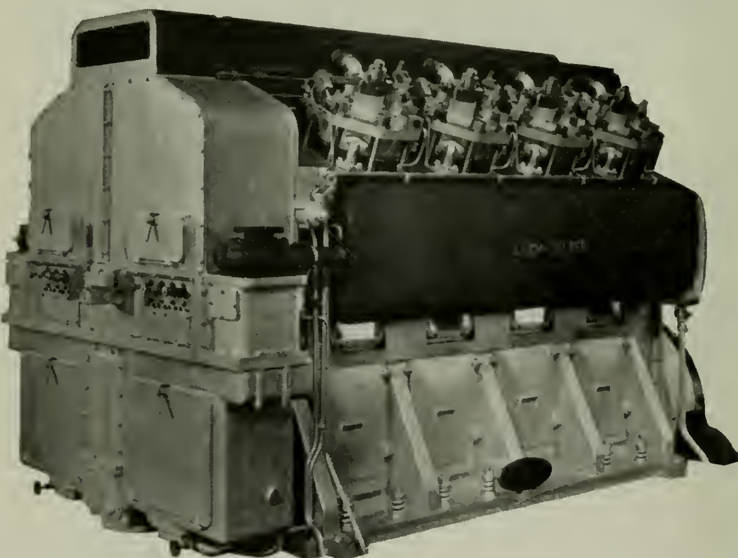


900 HP Ingersoll-Rand Diesel Engine.

extremely light weights gained by the use of expensive light materials are not essential for it is frequently necessary to add ballast in order to get the desired weight on drivers. Higher speeds, however, always are advantageous from a first cost standpoint, as the higher the speed the less the weight and cost of the generator.

The first engines built for locomotive service were of the four stroke cycle type. Within the last year two engine manufacturers have announced the development for locomotive and rail car service of two stroke cycle engines of unusually low weight per horsepower. No less than six or eight Diesel engine builders have announced engines for transportation service. These engines range in horsepower from 300 to 3500 and in speed from 600 to 900 RPM.

The Diesel engine has, inherently, constant torque characteristics, whereas the torque required at the wheels of a locomotive varies over a wide range. Therefore, whatever form of transmission is used between the Diesel engine and the wheels of the locomotive must be capable of transforming the power delivered by the engine in the form of constant torque and constant speed into power at the locomotive wheels which may have a wide range in torque and an equally wide range in speed. Mechanical transmission involves some form of clutch and the number of gear ratios is limited. Hydraulic transmission requires the use of packings and involves cooling of the liquid



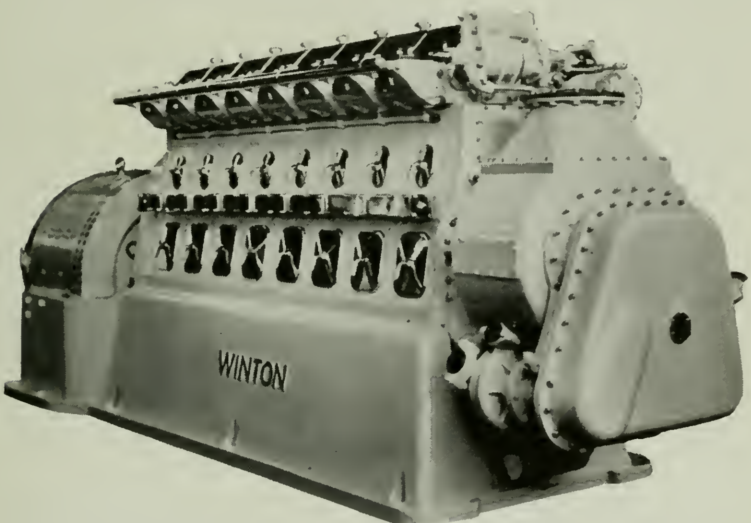
Busch-Sulzer 1600 HP Diesel Engine

transmission medium. Electric transmission has an infinite number of gear ratios, is capable of transmitting unlimited amounts of power, and has practically as high efficiency as any other form of transmission. It is now used almost universally on locomotives of 300 or more horsepower.

The electric transmission consists primarily of a generator, usually directly connected to the engine, a number of motors geared to the axles, and a control system for connecting the motors to the generator. One of the big advantages of the Diesel electric locomotive over its steam rival lies in its ability to exert its full power over a wide range of locomotive speeds.

The range in speed over which this is accomplished is determined by the characteristics of the electrical equipment.

The simplest form of transmission consists of a differentially wound series compound generator and four traction motors which may be connected in series and in parallel. As a Diesel engine is a constant torque machine it is essential that the generator be so designed that it will not demand of the engine more than it is capable of delivering. If the load on the engine becomes greater than it is capable of delivering it reduces its speed and actually delivers less than its rated power. The generator, therefore, must be designed to keep the engine fully loaded over a relatively wide range of locomotive speeds and must drop its load rapidly as the speed of the engine reduces.



Winton 600 HP Diesel Engine with General Electric Generator.

In switching service where the speeds do not exceed 15 to 20 MPH., the straight compound differentially wound generator fulfills the requirements.

There are two other methods now being used which increase the range of full engine power utilization. By the use of a specially designed exciter the voltage of the main generator may be regulated to maintain full output of the engine throughout almost any desired locomotive speed range. With this form of generator all regulation is inherent. The characteristics required are designed into the generator and no wearing parts will affect the adjustment.

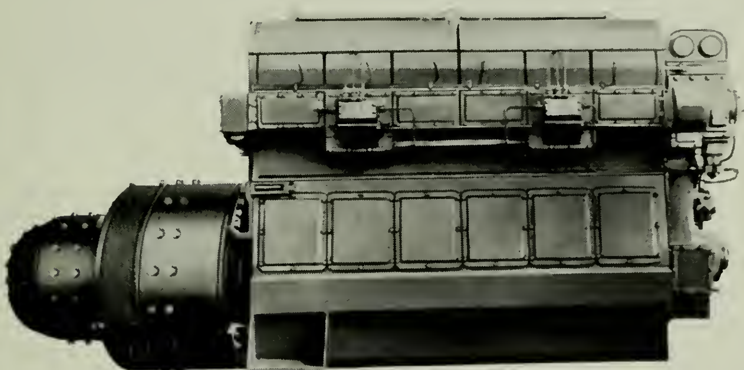
The second method of securing these results involves the use of an automatically operated rheostat or regulator. The generator load is controlled by the speed of the engine through the regulator so that the engine will always run at its full capacity whenever that capacity is demanded. The big advantage in this form of control is that the engine may always be loaded up to the value of load which it is capable of delivering.

Mechanically the traction motors used on oil-electric locomotives are of the conventional type mounted on the truck with one-half the weight taken by the axles and the other half by a nose suspension usually through some form of spring support. Electrically the voltage and capacity of the motors must be selected to perform the service demanded and match the volt-ampere characteristics of the generator.

The motors and generators on a Diesel electric locomotive are not entirely self-protecting. Unlike the steam engine which can be loaded up to its full capacity without any danger of damage, the electrical equipment will become overheated if a tractive effort beyond the rating is demanded for too long a period of time. The use of fire-proof material in the windings of both generator motors and control has, however, greatly reduced the danger of damage due to overload. Although the rating of the equipment may be based on some arbitrary temperature rise no particular damage is done if these temperatures are exceeded for short periods of time. It has become customary to rate motors and generators insulated with class "B" insulation at a temperature rise of 120°C. above the surrounding air. With an ambient temperature of 30°C. this means an ultimate temperature of 150°. No damage will be done to the modern mica and asbestos insulation if this temperature goes up for short periods of time to 180 or even 200°C.

When two or more engines are used on one locomotive the electrical equipment permits operating the engines together delivering power to the motors with each engine taking its full share of the load regardless of the speed at which the locomotive is operating. By the addition of a simple controller two or more locomotives may be operated together as one.

The proper functioning of the auxiliaries on a locomotive is essential to its successful operation. A Diesel engine dissipates as much power in the form of heat in the cooling water as it delivers in useful work. It is, therefore, necessary to have the radiators of ample size and a reliable source of power from which to operate the radiator cooling fans. An adequate supply of compressed air for the air brakes is vital to the safe operation of the locomotive. On the modern locomotive the engine is started from a battery. It is important that the battery be maintained fully charged. Although traction motors can be made large enough self-ventilated to deliver the required tractive effort to the wheels, it is far more economical to provide forced ventilation as this results in a smaller and lighter motor. Power must be available for driving the motor ventilating fans. Power for all these auxiliaries is usually obtained from an auxiliary generator direct connected to the main generator. It is made large enough to maintain its full rated voltage and capacity over the operating range of the engine. The



Cooper-Bessemer 450 HP Diesel Engine with General Electric Generator.

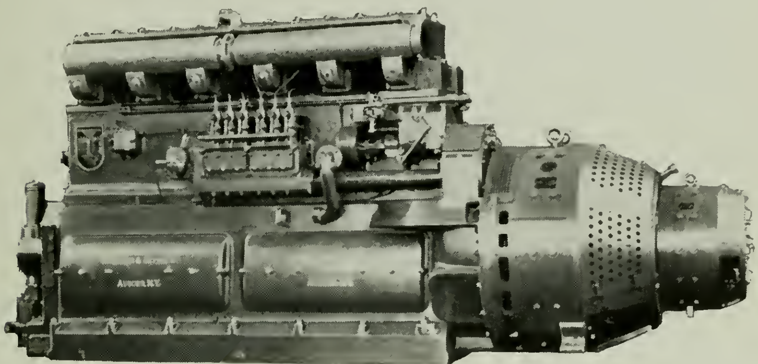
voltage is held constant by a voltage regulator. With a system of this kind a full supply of compressed air for the brakes, adequate cooling for the radiators and motors and a fully charged battery may be maintained, whether the engines are operating at full speed or at any speed from idling to full speed.

The manipulation of the control of a Diesel locomotive is extremely simple. The speed of the locomotive is governed by the output of the engine. The output of the engine is determined by its speed. The speed range of most Diesel engines is two to one; that is, it idles at one-half its full speed. When the engineer opens the throttle, field is automatically placed on the generator and it starts generating power. As the throttle is advanced the speed of the engine increases and the generator increases its output until at full engine speed the generator is delivering its full load. The engine speed is usually varied by changing the governor spring tension through a system of levers connected to the engineer's throttle. The locomotive is reversed by the throwing of the small handle of the controller. Although the motors are connected in two or three combinations, this is all done automatically. The only further instruction the engineer needs is to be told the proper buttons to push to start the engine and auxiliaries. The air brake is operated in the same manner as it is on the steam locomotive.

Most of the locomotives now in service are the box cab type. Small operating cabs are located at each end of the locomotive with the engines, generators and locomotive auxiliaries mounted in a compartment located in the cab between the two operating compartments. With this type of cab the operator is located at the extreme end of his locomotive where he can get a clear vision of the track in front of him and to either side. He cannot, however, see the track back of him and more or less inconvenience is experienced in getting signals when backing up.

To give the engineer a better view in both directions of motion, the so-called steeple cab type of locomotive has been developed. The 600 H.P. locomotives recently delivered to the Delaware, Lackawanna & Western Railroad by the General Electric Company are illustrations of this type of construction. The two engines each rated 300 H.P. are located in hoods at each end of the locomotive very much like an engine is located in the hood of an automobile. The engineer's operating positions are in a small cab in the center of the locomotive between the two engines. The floor of the operating cab is raised several feet above the level of the locomotive platform on which the engines are supported so that the engineer has an unusually clear vision of the track in both directions and has no difficulty in seeing signals from the ground crew, whether they be working at one end or the other of the locomotive. An operating position is provided at each side of the locomotive so that as occasion demands he can easily operate the locomotive from whichever side is more convenient.

Another feature of these locomotives which may be of interest is their mechanical construction. The two trucks are made of integral steel castings but the cab and platform are built up of structural shapes and sheets welded together. The underframe is approximately 42 ft. long, 10 ft. wide and 25½ in. deep at the draft gear housing. It is made entirely of structural shapes and plates welded together except for a cast steel centerplate which, however, is also welded in place. The underframe or platform carries a load of 128,000 lbs. not including the weight of the frame itself which weighs 28,000 lbs. bare. The backbone of the underframe consists of two 13¼″ H-beam



McIntosh & Seymour 600 HP Diesel Engine with General Electric Generator.

sections reinforced top and bottom with ⅜″ thick plate to make a box section. The top plate also forms the floor of the locomotive. The main beams were spaced so as to provide for bolting down the engines on the outside flanges which spacing is also used to form the pockets for the draft gear at each end. The pockets are dovetailed into notches cut into the flanges of the beams. Since space is always at a premium on locomotives the space between the main beams forms a convenient storage tank for fuel oil with a capacity of 400 gallons. Side plates extending from one beam to the other brace the beams and prevent surging of the oil.

The cab proper is made in three pieces; two auxiliary cabs, one over each engine, and a third or operating cab located in the middle of the locomotive. These cabs were all welded together of structural shapes with the outside sheets welded to the framework.

A welded frame of this nature eliminates the possibility of the loosening of rivets and insures a uniform texture of material throughout. In case of wrecks or collisions the structural members can readily be straightened and then rewelded into place.

It is, of course, the high thermal efficiency of the Diesel engine which makes the locomotive attractive as a form of motive power. The fuel consumption of the engines on the market ranges from .38 to .43 lbs. of fuel per horsepower hour with fuel oil having 19,500 Btu's per pound. This rate of fuel consumption corresponds to an engine thermal efficiency of from 30% to 35%. Electric transmission is frequently referred to as being one of the less efficient forms of power conversion but a careful analysis will show that this is not necessarily true. A modern well designed generator has an overall efficiency at normal load of 93%. A traction motor has an overall efficiency, including gears, of 90%. The product of these two percentages results in an overall transmission efficiency of 84%. Neither mechanical nor hydraulic drive will show an efficiency much above this value and any difference is more than offset by the flexibility of the electric drive.

There are, however, additional losses on the locomotive common to any form of drive which must be taken into account. Radiator fan motors, air compressors, ventilating fans, and storage batteries all take power from the engine. When allowances are made for these losses the overall efficiency from the crankshaft of the engine to the locomotive wheels may be from 76 to 80%.

With an engine efficiency of 33% and a transmission efficiency of 80% the overall thermal efficiency of the locomotive when operating at its normal rating is 26.4%. This corresponds to an efficiency under similar conditions on a modern steam road locomotive of 7 to 8% and of a modern steam power plant using steam under 1200 lbs. pressure of 27%.

The above efficiencies, however, are more or less theoretical in that they hold only when the particular power plant involved is delivering power at full load. In railroad service, and in particular switching service, the load factor or ratio of average horsepower output to the maximum possible horsepower output is extremely low. Electric transmission on a locomotive makes it possible to measure readily just what the average output is of a locomotive when operating in any particular service. Tests made indicate that a Diesel electric locomotive doing the work of a steam locomotive which burns 700 to 800 lbs. of coal per hour is delivering on an average less than 50 H.P. at its wheels.

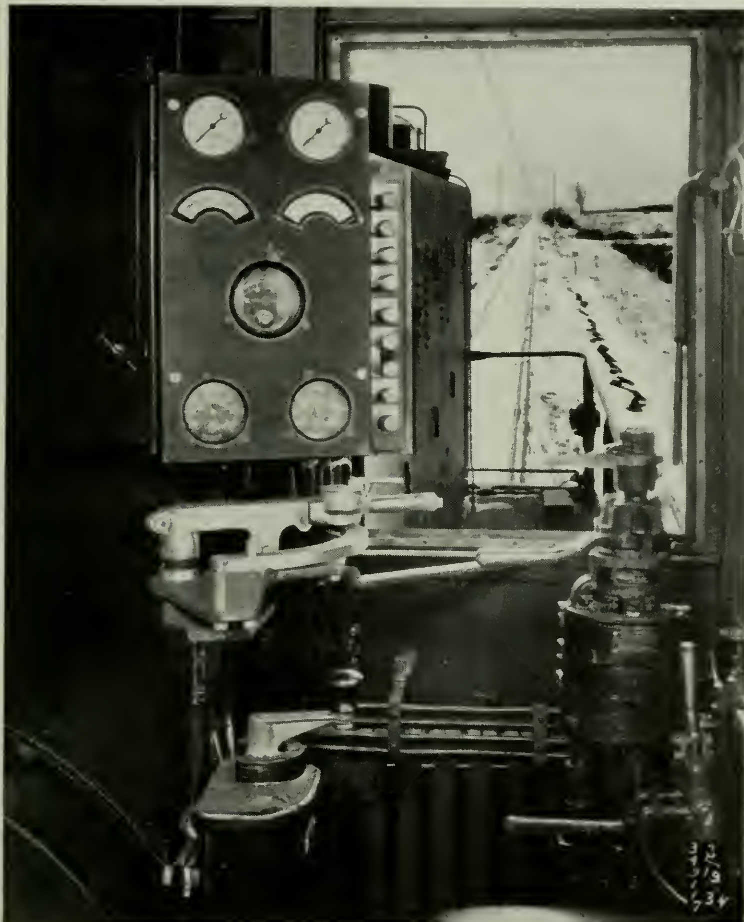
General Electric 600 HP 100-Ton Diesel Electric Locomotive equipped with two (2) Ingersoll Rand 300 HP Diesel Engines.

In other words, a locomotive capable of delivering from 1200 to 1600 H.P. continuously is actually working at an average of only 50 H.P. or at a load factor of from 3 to 4%. Naturally under these conditions the efficiency must be very low.

Assuming the steam locomotive burns 700 lbs. of coal per hour, that the coal contains 13,200 Btu's per pound, and that it delivers at the wheels an average of 50 H.P. its thermal efficiency under these conditions is 1.37%. Tests made indicate that a Diesel electric locomotive doing the same amount of work will burn approximately 7 gallons of fuel oil an hour. Assuming 7 gallons of fuel oil per hour with the fuel containing 19,500 Btu's per lb. and that the locomotive is also delivering 50 H.P. hours per hour, the thermal efficiency of the Diesel electric locomotive is 12.8% or almost ten times that of the steam locomotive. The greater efficiency of the Diesel electric locomotive is accounted for by the inherent design of an explosive engine compared to a steam boiler, and by the fact that its stand-by losses are much less than that of the steam. In order to have steam available when needed steam engines in switching service must burn coal at an almost uniform rate whether it is actually working or not. On the other hand, the oil-electric locomotive when not at work may have its engine shut down and use no fuel or the engines may be idling at which speed they use very little fuel.

Interstate Commerce Commission reports show that for 1933 it took 4.6 hours for each 100,000 ton miles of freight moved to get the freight through the yards. It took 3.8 hours to get the same amount of freight over the road. From 1921 to 1933 the time required to move 100,000 ton miles over the road was reduced from 6 to 3.8 hours, a reduction of 37%. During the same period the time in the yard for the same unit of freight movements was reduced from 5.4 to 4.6 hours, a reduction of 15%. While a saving in road service time of 37% was being made a saving in switching time of only 15% was made. From these records it is evident that the switching movements on the railroads as an average is not keeping up with the improvements being made in road service.

The experience of a number of railroads with oil-electric locomotive has proven that straight switching service can be materially speeded up with locomotives whose maximum power is far less than that of the steam locomotive which they displace. This is because the Diesel electric has its maximum power available at all speeds whereas a steam switching locomotive has only two-thirds of its power available at 10 miles per hour, which is the usual maximum speed permitted in yards, only one-third at 5 miles per hour, and still less at lower speeds. Furthermore, the smooth application of power through the elec-



View from Operating Position of General Electric 600 HP Diesel-Electric Switching Locomotive.

tric motors gives the Diesel electric a tremendous advantage in starting heavy trains and in moving trains through sharp curves without slipping the drivers.

The lighter six wheel steam switching locomotives in common use on the railroads have a maximum of approximately 1200 H.P. and can deliver about 31,000 lbs. drawbar pull. A

400 H.P., 75-ton Diesel electric locomotive in starting a train can develop over 40,000 lbs. tractive effort and can either accelerate a given train at a faster rate than the 1200 H.P. switcher or a heavier train at the same rate. It holds a marked advantage up to 5 miles per hour, after which the steam begins to improve its showing.

The heavier eight wheel steam switchers have on the average a maximum of approximately 1500 H.P. and develop from 52,000 to 55,000 lbs. of tractive effort. Although many such steam locomotives are operating under conditions where a 600 horsepower, 100-ton Diesel electric would be entirely successful, to do the switching service one of these locomotives is able to do requires a Diesel electric locomotive of 800 or 900 H.P. with 120 to 125 tons on drivers. A Diesel electric locomotive of this size will develop a maximum tractive effort of over 70,000 lbs. It too will accelerate a given train up to 5 or 6 miles an hour much faster than its steam rival. Above this speed the greater horsepower of the steam begins to be apparent.

Observations made in switching service in a number of yards indicate that the average distance of each movement is only 600 to 700 feet in length and the average trailing load from 300 to 400 tons.

The following figures indicate the time in seconds required to move trailing loads of from 350 to 1050 tons distances varying from 500 to 1500 ft. in a yard where the speed limit is 12 miles per hour, with a 600 H.P. Diesel electric, a six wheel switcher of 1200 horsepower and an eight wheel switcher of 1500 horsepower.

Trailing Tons	Distance in Feet	Time for 600 HP Diesel	Time for 6-Wheel Steam	Time for 8-Wheel Steam
350	500	44.5 Secs.	49.6 Secs.	46.2 Secs.
350	1000	72.9	78.0	74.6
350	1500	101.3	106.4	103.0
700	500	57.7	64.3	56.9
700	1000	86.5	92.7	85.3
700	1500	114.9	121.1	113.7
1050	500	67.8	77.7	67.4
1050	1000	101.0	109.1	97.0
1050	1500	129.4	137.5	125.4

This tabulation shows that as long as the trailing load is limited to 1050 tons as compared with the average of only 350 tons and the distance is limited to 1500 feet as compared with an average in general switching of only 700 feet the 600 horsepower Diesel will move the trains faster than the six wheel stamer and it is only when the loads reach 1050 tons for distances of 1000 feet or over that the eight wheel steam makes better time. An 800 H.P. or 900 H.P. Diesel would, of course, make a better showing than the 600.

The high tractive effort and low speed characteristics of the Diesel locomotive are ideal for hump service. This work is now being performed on many roads by Mallets. A 900 H.P. Diesel electric locomotive weighing 160 to 180 tons a large portion of which would be ballast will at 2 to 3 miles per hour deliver 80,000 to 90,000 pounds tractive effort, which is ample to handle the trains on almost any hump.

The main advantage to be gained by the use of oil-electric locomotives lies in their low operating costs. Operating costs are divided by the Interstate Commerce Commission into the following divisions:

Account 382—Fuel
385—Water
386—Lubricants
387—Other Supplies
388—Engine House Expense
311—Other Locomotive Repairs.

Account #382—Fuel:

The cost of fuel is naturally dependent upon the amount of work done. For comparative purposes the assumption is made that the steam locomotive will burn 700 lbs. of coal an hour and that the oil-electric locomotive will consume 7 gallons of fuel oil per hour. At $2.00 per ton as the cost of coal delivered on the locomotive tender (which is less than average figures) the cost per hour of the fuel in the steam locomotive will be $.70. With fuel oil costing 4 cents per gallon delivered on the locomotive the cost of fuel for the oil-electric locomotive will be $.28. On an average the cost of the fuel oil for an oil-electric locomotive can be taken as approximately one-third the cost of fuel on a steam locomotive, assuming both locomotives are doing the same amount of work.

Account #385—Water:

The cost of water for the steam locomotive varies widely with conditions. Where water has to be treated it may be high; where water is plentiful and of good quality it is relatively low.

Data gained from various roads spread over the country indicates that the average cost for a switching locomotive is between \$.07 and \$.08 per hour. The only water used on a Diesel electric locomotive is that for cooling the engines and the loss is only by evaporation. As only a few gallons are used per week the cost of water is negligible.

Account #386—Lubricants:

Records of lubricating and fuel oil consumption made on Diesel electric locomotives in switching service indicate that on the average the amount of lubricating oil used is less than 2% in volume of the amount of fuel oil used. If the locomotive uses 7 gallons of fuel oil per hour it will use not more than .14 gallons of lubricating oil per hour, which, at \$.50 per gallon, will cost \$.07 per hour. The Diesel engines naturally use more lubricating oil than the steam engines but this is practically the only item where the Diesel engine expense exceeds that for the steam engine.

Account #387—Other Supplies:

This account is low for either Diesel electric or steam engine, but records indicate that the supplies for a Diesel engine are equal to about one-half of the cost of the supplies for the steam engine.

Account #388—Engine House Expense for Yard Locomotives:

The engine house expense depends largely on local conditions. To meet I.C.C. requirements periodic inspections are necessary. However, as there are no fires to clean it is not necessary that the Diesel electric locomotive be taken to the roundhouse except for its monthly inspection. Daily inspection, fueling, sanding and the addition of a few other supplies used may be performed in the yards where the locomotive is operating. This practice reduces this item of expense to only a fraction of the cost for steam operation. Where a steam locomotive has been costing \$.42 per hour for this service the oil-electric has been costing only \$.07 for this same account.

Account #311—Other Locomotive Repairs:

The cost of other repairs on a Diesel electric locomotive may be divided into two parts; first, the Diesel engine and, second, the mechanical and electrical equipment. Records of installations indicate that where 600 H.P. Diesel locomotives are operating between 5,000 and 6,000 hours per year the engines cost approximately $3.00 per rated horsepower per year for maintenance and the electrical and mechanical portions of the locomotive cost $.05 per mile or $.30 per hour. Assuming 6,000 hours operation per annum per locomotive, the cost per hour for Other Locomotive Repairs will amount to $.60 or $.10 per mile.

The first cost of the Diesel electric locomotive is admittedly higher than for a steam locomotive to perform the same service. This must be taken into account when comparing the cost of operation of the two types of locomotives. There are certain factors, however, which tend to equalize these two costs. The oil-electric locomotive can be used more hours per year than the steam. Although the ratio varies with the particular application one oil-electric locomotive will ordinarily replace more than one steam locomotive. In one particular instance where steam locomotives were replaced by oil-electrics, it was possible to replace 11 steam units with six Diesel electrics. In this case the roundhouse was several miles away from the yards in which the locomotives were to be used. It was necessary to take the steam locomotives back to the roundhouse at least once a day which consumed considerable time. When the oil-electric locomotives were purchased fuel tanks, sanding and water facilities were arranged for in the yard where the locomotives were used. The Diesels were given a daily inspection and supplied with fuel and sand once a day during the time the crew was eating their lunch. In this way each locomotive was kept in service 24 hours a day, as this was a continuously operated yard. Once each month the locomotive was taken to the roundhouse for a monthly inspection which was usually done within an eight-hour period. It was, therefore, possible in this case to operate each locomotive with only eight hours of time out per month. The locomotives were given a general overhauling which usually requires two or three weeks' time not more than once every year. Under operating conditions of this kind it can readily be seen how an oil-electric locomotive can replace more than one steam locomotive. An average ratio is that two oil-electrics will replace three steam locomotives.

Where new power is required in almost every case it can be shown that the Diesel electric locomotive will earn a very handsome return on the additional cost over what new steam locomotives capable of doing the same service will cost. Where, however, steam power is already available and it is necessary to justify the expenditure of the total cost of the Diesel electric locomotive, the service must be such that the locomotive can be operated at least 16 hours per day. Under these conditions it is often possible to show an attractive return.

This paper has been confined to the use of Diesel electric locomotives in switching service. Engines are now available which make it possible to build road locomotives of almost any desired horsepower, weight and speed. Engines of as high as 3500 H.P. have already been designed for locomotive service. The road locomotive may be powered with one large engine or two or more smaller units. Most of the advantages applying to the Diesel switching locomotive are applicable to the larger locomotive and the next step in the development of Diesel power may be in the direction of this larger field of application.

PRESIDENT: During recent years we have had a number of papers on forms of energy other than steam, but almost invariably they have carefully kept away from the question of cost. Mr. Krape has not only given us the actual costs but has segregated them according to the Interstate Commerce Commission classification, which will give you an elegant opportunity to digest them. And since there are a number of experts in the room, some of whom have had experience with these or similar locomotives, I would like to have them volunteer and state their experience, particularly as to the question of cost, which is a prime consideration to an operating man.

If there are no volunteers, I will have to call on you. Mr. John E. Hughes, of the P. & L. E. R. R.?

MR. J. E. HUGHES: I would rather be excused. I have listened to the paper with a great deal of interest, but I would rather be excused from any attempt to discuss it.

PRESIDENT: Mr. W. F. Ambrose, Master Mechanic of the A. & S. R. R., may we hear from you.

MR. W. F. AMBROSE: There is nothing I can add. I am not well enough versed in the operation of the locomotive to be able to talk very much about it.

PRESIDENT: Mr. H. D. Webster, of the Bessemer & Lake Erie, will you discuss the subject?

MR. H. D. WEBSTER: I have nothing to add to what the speaker has told us.

PRESIDENT: Mr. A. E. Herrold, Master Mechanic and

Master Car Builder, Monongahela Connecting Railroad, we would like to hear from you.

MR. A. E. HERROLD: I do not know that I can add anything at the present time.

PRESIDENT: Mr. William Triem, Superintendent Monongahela Division, P. R. R., tell us what you think about this.

MR. WILLIAM R. TRIEM: Mr. Chairman—Apropos of wanting to talk on this subject: I was just remarking that this engineer tonight is different from most of us—he can both talk and think. Most of us only talk!

The distances cars are to be moved and the tonnage of them, as described tonight, are much less than I have found in my experience in our yards. I presume that the development of these Diesel switching engines will eventually progress to this heavier service.

I am very much interested in this subject and feel indebted to the speaker for his splendid presentation of interesting facts and figures.

PRESIDENT: Mr. N. W. Storer, Consulting Railway Engineer, Westinghouse Electric and Manufacturing Company?

MR. N. W. STORER: There is not much that I can add to this very comprehensive paper tonight, but I would like to comment on one or two points, especially to support some of the statements Mr. Krape has made in regard to the comparison between the Diesel electric and steam locomotive.

Mr. A. H. Candee, of the Westinghouse Electric and Manufacturing Company, had a very interesting paper in the Railway Age of December 2, 1933, in which he compared the service capacities of a 1220 H.P., 8-wheel steam locomotive with 111 tons on drivers, with an 800 H.P. Diesel electric with 115 tons on drivers. Speed-time curves show that the two locomotives will move a 500-ton train 740 ft. in exactly the same time, or a 2000-ton train 1620 ft. in the same time. For shorter runs than this the Diesel electric is faster. For longer runs it is slower than the steam. This indicates that for practically all ordinary switching service a Diesel electric can do the work better even with less horsepower capacity than the steam locomotive. This is due to the fact that the maximum tractive efforts of the Diesel electric are much greater than those of the steam locomotive, due principally to the fact that the pulsating torque of the steam locomotive decreases the tractive effort. For runs longer than these the steam locomotive will have the advantage, and in such service the Diesel electric would have to have engine capacity fully equal to that of the steam locomotive.

Comparing the Diesel electric with a Diesel locomotive with mechanical drive, the curves show that it will take 25-30% more capacity in the engine with mechanical drive than with electric to obtain the same average horsepower at the wheel. This is due to the fact that the engine speed with mechanical drive is much of the time far below its full speed. The mechanical drive necessitates reducing the engine speed by approximately 50% every time the gear ratio is changed to get an increased train speed. The output of the engine, therefore, is reduced in proportion. With the Diesel electric, the engine can be worked at its maximum load at practically any speed within a wide range and the electric drive will transform that output into tractive effort and speed in whatever relation is desired.

I am very glad to note the attention which Mr. Krape has given to the auxiliaries. We have been working for years to have the auxiliaries properly taken care of. The torque control system offers the best method of handling these, as well as making it possible to utilize all the power that the engine is able to deliver at any time. This is particularly necessary for any type of motive power where the capacity is limited as it is with the Diesel electric or steam locomotive.

PRESIDENT: Mr. William F. Kromer, Mechanical Engineer, H. Kirk Porter Locomotive Works, have you anything to add to the discussion?

MR. WILLIAM F. KROMER: Mr. Krape, I would like to ask a question. The load factor stated for switching locomotives seems unusually low. What do you consider the average load factor for Diesel electric locomotives in switching service?

MR. KRAPE: That load factor was obtained in a yard in the Middle West where manifest freight was handled. The loaded cars ran between 40 and 50 tons and the load varied from 3 or 4 cars to 20 to 30. It has been checked in several other yards where the service is similar.

MR. KROMER: The reason I ask this question is that in proposing switching locomotives we take a load factor at least three times as large. Mr. Krape's talk has been very interesting and enjoyable to me.

PRESIDENT: Mr. L. S. Boggs, Field Supervisor, Oil-Electric Equipment, Westinghouse Electric and Manufacturing Company?

MR. L. S. BOGGS: I haven't anything to say. I have enjoyed very much Mr. Krape's paper. It has brought out some very good points.

PRESIDENT: Mr. Endsley, this is along the line of your hobby. What have you to say about it?

MR. L. E. ENDSLEY: I have enjoyed very much the very clear description of the different methods of handling the Diesel engine power in locomotives. But I think we are going to have the steam locomotive a while yet. There is a saving in fuel with the Diesel, and a saving in stand by losses. The steam locomotive burns, as the speaker has said, a good many pounds of coal standing still waiting for something to do. I ran some tests on a locomotive at Purdue in which I ran the locomotive one-fifth of the time, and one-fourth of the time, and one-third of the time, and saw what the saving was in running it all the time. While there is some difference we do not lose 700 lbs. an hour if we do not run. Indeed I do not see how you could burn 700 lbs. an hour developing only 50 H.P. It does mean something when you run a locomotive 24 hours a day. We cannot run a steam engine 24 hours a day. We have to take it back and clean the fires, and we cannot get full power out of the steam locomotive at all times. And I think some of the switching work is bound to come to the Diesel locomotive. We are making better Diesel engines. The steam locomotive, I was glad to hear him say, is getting 7 to 9% thermal efficiency. I remember the first test I made thirty years ago we thought we were doing well to get 5%. The Diesel engine cannot be looked down upon by any steam engine man. I am a lover of the steam locomotive, but the Diesel engine has its field. It is I think without a doubt the short switching field. It is not yet suitable for long yards where they haul a full train from one end to the other. The Diesels will not yet do that work. But we will have larger Diesel engines.

They may eventually do away with the steam engine but I do not expect to see it in my time.

It has been a splendid paper and I have enjoyed it very much.

PRESIDENT: Mr. Snyder, we would like to hear from you.

MR. F. I. SNYDER: Mr. President, I haven't anything to add to the discussion, but I would like to ask Mr. Krape a question, as to what experience or judgment there is as to the service life of the oil-electric switching engine, or, to put it another way, what would be the proper rate of depreciation for these units?

MR. KRAPE: It is hard to answer that question in view of the fact that the Diesel electric locomotive is only 10 years old. However, a Diesel engine has practically all its wearing parts, such as cylinders or cylinder liners, bearings, rings, etc., renewable and if properly maintained will last almost indefinitely. I would expect it to be replaced more often due to obsolescence than from wear. Diesel engines are being constantly improved and will probably become obsolete before being worn out.

MR. SNYDER: This has been a very interesting discussion. As the President has stated earlier in the evening, we have had a number of discussions on the general subject of oil-electric and gas-electric units, but in some respects this paper has brought out new and important information. I think the Club owes a debt of appreciation to Mr. Krape for coming here and presenting this paper and discussion and I would therefore move that we extend to him a rising vote of thanks.

The motion was duly seconded and prevailed by unanimous vote.

There being no further business, On Motion the meeting adjourned.

J. D. CONWAY, Secretary.

In Memoriam

JOSEPH H. KUMMER

Joined Club March 26, 1915

Died March 18, 1934

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

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Vol. XXXIII. APR. 26, 1934. No. 6.

Pennsylvania Railroad Store Door Collection and Delivery Service—What It Is and How It Operates

By E. A. FOARD, Superintendent,
Stations and Transfers, Pennsylvania Railroad, Pittsburgh, Pa.

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 6.

Pittsburgh, Pa., April 26, 1934

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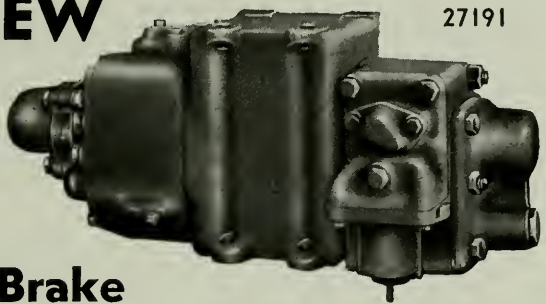

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OFFICIAL PROCEEDINGS
OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Vol. XXXIII No. 6. | Pittsburgh, Pa., April 26, 1934 | $1.00 Per Year 25c Per Copy

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
APRIL 26, 1934

Before the business of the evening was taken up, a very wonderful program of music was given by the Music Department of the J. M. Logan School, Pittsburgh, the chorus consisting of fifty youngsters averaging nine or ten years of age. Mrs. Effie H. Whitlow, Principal of the school, was introduced and gave an interesting explanation of some of the aims of the Music Department. She said in part:

MISS EFFIE H. WHITLOW: Greetings, friends: Since coming here this evening, I am more pleased than ever that I am a school teacher and that my life works in with the lives of children. Tonight we are going to show something that is practically new in the public schools. Creative work by the pupils. We do creative work in other subjects, but as we are going to show you our music tonight, it will be our creative music which will be demonstrated.

I want to introduce some of the workers in the field of music, Miss Margaret A. Pfromm, seated at the piano, the classroom teacher, and Mrs. Sara Marie Herbert, supervisor over a large section of Pittsburgh.

In working out our creative music, the teacher talks about familiar things, say: the seasons, winds, flowers, birds, etc. After the child has discussed a subject the teacher asks for original sentences; the response is generally very good—every one is anxious to tell something. When the teacher is satisfied the children are familiar with the subject, she asks for some one to volunteer to sing some of the sentences. Perhaps many will sing and then they make a selection of which sounds the best. After the selection is made by the children the teacher has the child repeat the tune and as the child sings, the teacher has her sheet of music paper marking the exact tones made by the child. It may be a single phrase or it may be many phrases, the number of phrases usually increase as we go from the lower to the higher grades and thus we have worked out phrase by phrase the little operetta which we are going to present this evening; both words and music being creative. We hope you will be pleased with this work of the children.

The following program was presented by the children:

THE J. M. LOGAN MUSIC DEPARTMENT
in a
SPRING MUSIC FESTIVAL

Heigh Ho, Come to the Fair	English Folk Tune
Mother of Mine	Andre Gretry
Autumn Dreams	Beethoven

Chorus

Cossack Dance	Russian Folk Tune

3AB Toy Orchestra

Introduction	Ruth Carcia

Pine Tree Music	French Folk Tune
Jutlandish Dance	Reimann
Lullabye	Brahms
Ave Maria	Gounod
The Piper	Bohemian Folk Song

Chorus

Minuet in G	Beethoven

3AB Toy Orchestra

Introduction	Margaret Bendig

LITTLE BOY BLUE
Original Operetta By 5AB Class

ORIGINAL SONGS

Little Boy Blue	Still and Dark
Night Time	Awake! Awake!
On Guard	Faithful Friends
Good Night, Toys!	My Prayer

CAST

Eugene Field	Jack Hoover
Boy Blue	William Hoover
Angel	Aileen Meers
Toy Dog	Margaret Pflaum
Tin Soldier	Catherine Nemenz
Unseen Voice	Christine Grote
Original Songs	Chorus

Massa Dear	Dvorak

O Susanna .... Foster
Steal Away .... American Negro Song
Prayer .... von Weber

Chorus

STAFF

Dr. Ben G. Graham, Superintendent of Schools
Dr. Will Earhart, Director of Music
Effie H. Whitlow, Principal, J. M. Logan School
Sara Marie Herbert, Supervisor of Music
Margaret A. Pfromm, Teacher of Music
Grace Hartman, Accompanist
Jack Brammer, Accompanist

MR. FRANK J. LANAHAN: What I have to say is going to be to the children. Little Ladies and Gentlemen: You do not know that you have woven around us a charm in the mystic halls of memory and that these gray haired, bespectacled gentlemen sitting in this audience have been indulging in the same little pastime of dreams as the father of Little Boy Blue sitting in that chair. They have been saying to themselves,

"Backward, turn backward, O Time in your flight,
Make me a boy again just for tonight."

As Little Boy Blue brought up the miniature soldiers and placed them on the wee chair, so many a man here tonight pictured himself in memory in the days of long ago. But I think they will all agree that no such charming lady led them in their singing nor did such a bevy of beauties charm them in their early days. I like to dwell on this because I thoroughly believe that I speak for all here when I express not only the delight with which we have listened to this very wonderful program but our confidence in the future citizens that are going to take our place fortified with such early training and development. And I wish to express to you the sincere thanks of the Railway Club and our appreciation of the work and the accomplishment of your leaders.

PRESIDENT: After the delightful entertainment we will now get down to the business part of the meeting.

The roll call will be dispensed with as we have a full record of attendance on the registration cards.

Unless there is a desire for it, we will dispense with the reading of the minutes of the last meeting, as the printed Proceedings have already been published to you.

Attendance, as shown by registration cards collected at door, 152, as follows:

MEMBERS

Anderson, Burt T.
Ashley, F. B.
Babcock, F. H.
Baker, George N.
Baker, J. B.
Barr, H. C.
Beam, E. J.
Bell, Dan H.
Berg, Karl
Bone, H. L.
Britt, T. E.
Bull, R. S.
Burel, W. C.
Campbell, J. E.
Cannon, T. E.
Carr, T. W.
Christy, F. X.
Conway, J. D.
Courtney, H.
Cruikshank, J. C.
Dambach, C. O.
Davies, James
Davis, Charles S.
Downes, D. F.
Durkin, James E.
Emery, E.
Emsheimer, Louis
Endsley, Prof. Louis E.
Evans, David F.
Falkner, A. J.
Farmer, C. C.
Fenton, H. H.
Ferguson, R. G.
Flinn, R. H.
Forsberg, R. P.
Frauenheim, A. M.
Fults, J. H.
Furch, G. J.
Gardner, George R.
Gatfield, Phillip I.
Gilg, Henry F.
Glaser, J. P.
Glenn, J. H.
Goda, P. H.
Grieve, Robert E.
Hansen, William C.
Harbaugh, C. P.
Holmes, E. H.
Hoover, J. W.
Huff, A. B.
Irwin, R. D.
Kapp, A. C.
Keller, P. E.
Kentlein, John
Kerr, C. R.
Kirk, W. B.
Knox, William J.
Kramer, W. E.
Kraus, Raymond E.
Lanahan, Frank J.
Lanahan, J. S.
Lee, L. A.
Leet, C. S.
Logan, J. W., Jr.
Long, R. M.
Longdon, Clyde V.
Lynn, Samuel
Misner, G. W.
Mitchell, W. S.
Morgan, A. L.
Morgan, Homer C.
Murray, Stewart
Mussey, D. S.
McAbee, W. S.
McGeorge, D. W.
McIlwain, J. P.
McIntyre, R. C.
McKinley, John
McKinzie, E.
McMillan, A. P.
McNamee, William
O'Sullivan, J. J.
Pickard, S. B.
Purchard, Paul
Rauschart, E. A.
Renshaw, W. B.

Richardson, E. F.
Richardson, H. R.
Ryan, D. W.
Schadt, A. D.
Severn, A. B.
Sheets, H. E.
Sixsmith, G. M.
Snyder, F. I.
Stein, J. A.
Stevens, R. R.
Stucki, A.
Sullivan, P. W.
Sutherland, L.
Thomas, H. N.
Thomas, T.
Trax, L. R.
Triem, W. P.
Van Vranken, S. E.
Waterman, E. H.
West, Troy
Wheeler, C. M.
White, H. A.
Wildin, G. W.
Winslow, S. H.
Wright, J. B.
Yarnall, Jesse

VISITORS

Carroll, D. C.
Clark, H. C.
Cornell, L. E.
Cotton, C. S.
Crow, C. C.
Devengio, Vincent
Ferguson, James R.
Foard, E. A.
Glauch, E. S.
Gray, H. H.
Hoerner, A. S.
Jenkinson, Carlyle
Keck, L. M.
Keeling, A. J.
Krahmer, E. F.
Leonard, Ross C.
Lewis, S. B.
Lloyd, J. A.
Lofgren, John F.
Lumpp, R. J.
Meredith, A. R.
Mosley, I. H.
Munph, C. E. Ted
McAbee, Albert
McCrea, C. M.
McDevitt, Walter
Page, A., Jr.
Post, W. M.
Read, A. A.
Reynolds, D. E.
Robertson, C. N.
Shortuse, Rodham
Smith, Robert B.
Smith, Sion B.
Snee, S. H.
Stoetler, Harvey K., Jr.
Thomas, John J.
Turkes, W. R.
Vollmer, Paul F.
Weaver, E. H.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Page, A., Jr., Lubrication Engineer, Gulf Refining Company, 708 Ravenswood Avenue, Bellevue Branch, Pittsburgh, Pa. Recommended by R. H. Flinn.

Sneckenberger, E. R., Yard Master, P. & L. E. R. R., 803 Emerson Avenue, New Castle, Pa. Recommended by George L. Henderson.

PRESIDENT: In accordance with our By-laws these proposals will be referred to the Executive Committee, and upon approval by that Committee the gentlemen will become members without further action of the Club.

Are there any announcements?

SECRETARY: Since our last meeting we have received information of the death of two of our members: C. W. Caldwell, Representative, James B. Sipe & Company, died February 22, 1934, and Charles E. Hale, Sales Representative, The Baldwin Locomotive Works, Philadelphia, Pa., died April 16, 1934.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings.

If there is no other business, we come to the paper of the evening. Our speaker tonight is Mr. E. A. Foard, Superintendent Stations and Transfers, Pennsylvania Railroad, Pittsburgh, Pa., who will address us upon the subject "Store Door Collection and Delivery of Freight," which might more properly be stated, house to house. I take a great deal of pleasure in introducing to you Mr. Foard.

Pennsylvania Railroad Store Door Collection and Delivery Service—What It Is and How It Operates

By E. A. FOARD, Superintendent,
Stations and Transfers, Pennsylvania Railroad, Pittsburgh, Pa.

Mr. Chairman and Gentlemen: It is a privilege and an honor to be given the opportunity of discussing with you this evening an interesting experiment now being carried on by the Pennsylvania Railroad Company—"Collection and Delivery of Less than Carload Lot Freight, more commonly known as STORE DOOR COLLECTION AND DELIVERY SERVICE." Why was this service started? Is there a real need for this service? How does this service operate? Those are the questions the Chairman of your Subject Committee requested me to answer for you and I shall do my best to comply.

First, let us consider the need for this service. In the year 1932 rail LCL and Express services handled about 18,000,000 tons of merchandise. This was less than 37% of the average amount handled in the three years 1923 to 1925, inclusive. Rail merchandise traffic began to decline in 1925 at the rate of from 2 to 4% until 1929. From 1929 to 1930 it decreased 18%; from 1930 to 1931, 23%; from 1931 to 1932, 33%; and for the first nine months of 1933, 7%. While I hesitate to burden you with statistics I cannot refrain from quoting the following figures to emphasize the tremendous amount of decrease in less than carload tonnage and revenue on the Pennsylvania Railroad since 1923:

Year	Tons	Revenue
1923	9,129,819	$ Not available
1924	6,900,929	"
1925	7,277,974	"
1926	6,461,578	"
1927	6,149,962	"
1928	5,627,337	49,645,540
1929	5,627,103	50,576,247
1930	4,677,591	41,529,662
1931	3,725,989	33,565,815
1932	2,579,514	24,846,616

This represents a decrease in tonnage handled in 1932 as compared with 1923 of about 72% and since 1928 (which is the first year revenue figures are available) the revenue from LCL freight has decreased about 50%.

That this decrease in tonnage and revenue is greater than warranted by depressed business conditions bears no argument. What happened to this business? The answer can be found in the recent release of the Federal Coordinator of Transportation in connection with the Merchandise Traffic Survey made by his Section of Transportation. The period studied was the year 1932 and it was found that merchandise traffic was handled during that year as follows:

Rail L.C.L. Tonnage	15,234,000
Express L.C.L. Tonnage	2,826,000
Forwarder L.C.L. Tonnage	1,902,000
Total Rail	19,962,000
TOTAL HIGHWAY	32,260,000
GRAND TOTAL	52,222,000

Thus it can be seen that two-thirds of the traffic formerly moving by rail is now moving by competing agencies, and the volume handled by trucks over the highways was more than twice the rail tonnage—another interesting fact being that more than one-half of the highway tonnage moved in excess of 50 miles. The Federal Coordinator asked thousands of shippers why they preferred the trucks and replies received indicated truck preference for the following reasons (figures being percent of tonnage reported):

Faster service	73%
Cheaper total cost	67%
DELIVERY SERVICE	67%
Convenience (flexibility)	61%
COLLECTION SERVICE	54%
Cheaper packing	27%
Late acceptance of shipments	26%
Simpler classification	25%
Less damage to freight	14%

Note that 67% preferred trucks account DELIVERY SERVICE and 54% because of COLLECTION SERVICE. Seventy-four per cent of shippers said they wanted COLLECTION AND DELIVERY SERVICE—only 12% that they did not. It is therefore very apparent that there is a widespread established demand on the part of the shipping public for a complete door to door merchandise service. In fact, it is a commercial necessity today. To meet this demand and, of course, to restore as much as possible of the L.C.L. business lost to the Railroad and retain that which otherwise might be lost to other transportation agencies the PENNSYLVANIA RAILROAD in its Tariff I.C.C. 1100 on December 1, 1933, inaugurated STORE DOOR COLLECTION AND DELIVERY SERVICE throughout its entire System. Now for the mechanics of the plan:

The general application of the Tariff provides for collection of outbound L.C.L. freight and delivery of inbound L.C.L. freight as requested by the shipper or the consignee.

Patrons should indicate on their bill of lading the character of service desired, that is—"Collection And Delivery Service"—"Collection Service" or "Delivery Service." If the shipper fails to request "Delivery Service" on his bill of lading, the consignee can secure that service on request to the destination Freight Agent. To obtain Collection and Delivery or Collection or Delivery Service, all a patron need do is phone or write the nearest Pennsylvania Railroad Freight Agent. That completes the patron's part of the transaction. The Railroad will do the rest. Freight will be collected, moved to the Railroad Station, dispatched by rail the day picked up and prompt delivery made to the customer's door at destination. ONE TRANSACTION—ONE RELIABLE TRANSPORTATION AGENCY.

On Pennsylvania Railroad traffic, that is, traffic originating on the Pennsylvania Railroad and destined to a station on that Railroad, the collection and delivery service will be performed free up to 260 miles of railroad haul—beyond that distance of railroad haul the tariff provides for a progressive charge over existing class rates until 360 miles of railroad haul is reached, when the maximum plus charge of 6 cents per cwt. in addition to the freight rate for either collection or delivery service is made, and 12 cents per cwt. in addition to the freight rate for both collection and delivery service.

On connecting line traffic where the applicable class rate is 29 cents or higher, freight will be collected or delivered, as the case might be, at a charge of 6 cents per cwt., with a minimum charge of 25 cents per shipment collected or delivered. On outbound freight this charge must be paid by the shipper and on inbound freight by the consignee.

On both local and interline freight, the minimum rate is 35 cents per cwt. and the minimum charge for a single shipment 50 cents.

"COLLECTION" of freight as used in the tariff means that the Railroad Company will call for and collect L.C.L. freight (receipting for same) from a platform or doorway directly accessible to trucks at the consignor's warehouse, factory, store or similar place of business and includes the transportation therefrom to the Railroad Company's freight station.

"Delivery" of freight as used in the tariff means exactly the reverse. Nothing in the tariff shall require the Railroad to collect or deliver freight at locations at which, on account of condition of streets or alleys it is impracticable to operate vehicles.

Stations at which this new service is available are named in the tariff. The territorial boundaries for Collection and Delivery Service of each city or town are also defined in the tariff. With a few exceptions, non-agency stations for the present at least are not being accorded collection and delivery service.

Under the tariff one tender of freight will be made and this shall constitute delivery service as contracted for at rates shown. In the event delivery cannot be made through no fault of the railroad, the freight will be returned by the truckman to the billed destination freight station and held, subject to disposal orders from the consignee, and also subject to the provisions of lawful storage tariffs.

Arrival notices will not be sent consignees on freight subject to delivery service unless the carrier is unable to deliver the freight on first tender and in this event arrival notice will be left at the consignee's place of business by the truck driver.

No allowance of any nature is made to patrons who elect to perform their own drayage when freight is billed in collection or delivery service. For individuals or firms having private or industrial sidings, at the option of the Railroad, shipments will be handled by truck or by ferry car under existing ferry car tariffs and will not be subject to the minimum provisions of such tariffs.

Collection and Delivery Service will not apply on the following commodities:

Explosives—various kinds of which are named in the tariff.

Freight in Bond.

Live Animals.

Live Game, Pigeons or Poultry.

Hides and Skins, loose or in bundles, not dried.

Perishable freight requiring protection in transit.

Shipments covered by "Order Bill of Lading."

Show Cases.

Shipments which owner is required to load or unload under Rule 27 of Official, Illinois, Western or Southern Classifications or Exceptions to said Classification.

Articles in one piece or package of dimensions exceeding 14 ft. in length, 6 ft. in width, or 6 ft. in height, except Pipe, Lumber and Nursery Stock.

Now a word about transportation and terminal service. It is our ambition to give over-night service from Pittsburgh to destinations within 260 miles of Pittsburgh and since the inauguration of our collection and delivery service 13 second day schedules have been changed so as to afford first morning delivery to that number of points. Arrangements have also been made to speed up our terminal delivery service—for example, here in Pittsburgh our unloading operations at our Eleventh Street Freight Station starts at 2:00 A. M. A large percentage of our inbound merchandise cars are available for unloading between 2:00 and 7:00 A. M. and the early unloading start should, of course, insure delivery at store door in Pittsburgh before 10:00 A. M. on the day the freight is unloaded. Every effort is being made to forward freight in outbound cars on the day the freight is collected. Road schedules are being tightened.

We make no claim that our tariff or this new collection and delivery service is perfect. As I said at the beginning of my talk, the service is experimental. Those in charge of the service on our railroad are trying to be more critical of it than are our patrons. Almost daily our Agents and other employes are recommending new features for incorporation in our collection and delivery service tariff. Right now consideration is being given to broadening the tariff to permit of the handling of Order-Notify shipments in this service, or to the establishment of a Collect On Delivery feature; also to changing the length restriction in Rule 10 of the tariff from 14 ft. to 22 ft., and to changing the minimum freight rate from 35 cents to 30 cents. Constructive criticism and suggestions for improvement in either the tariff or in our road or terminal service are invited from patrons and railroad employes alike.

One feature of this service which is advantageous to shippers, which I desire to point out before I close, is the fact that it has recently been developed that the cartage charges to shippers who arrange for the delivery of their shipments to freight stations for transportation and for delivery to patron's store door at destination amounts to an average of 18 cents per 100 pounds, which is approximately 20% of their freight bill. By using Pennsylvania Railroad collection and delivery service to a maximum road haul destination the cartage costs are reduced to 12 cents per 100 pounds, or one-third, and, of course, when this service is used in the free zone, or to destinations up to 260 miles distance from Pittsburgh, the terminal cartage cost to shippers and consignees is entirely eliminated.

I urge shippers who are here tonight to try this new service. I am sure you will find it dependable and satisfactory. In order to retain that L.C.L. business which the carriers now enjoy and to regain that L.C.L. traffic lost to competing agencies in the last several years, railroad employes should learn as much as possible about this new service, which is universally demanded by shippers and receivers of freight and then sell it to their business friends.

I hope my explanation of this new Railroad service has been clear to you and I now invite any questions you might have to ask—I'll try to answer them. Thank you for your kind attention.

PRESIDENT: Mr. Foard says he is willing to answer any questions you may wish to ask, and I think it is a question that will provoke a lot of discussion.

MR. HENRY F. GILG: I have been observing ever since the Interstate Commerce law was enacted that there have been restrictions put upon railroads by political agencies and I want to ask you gentlemen to consider an experience I had this last month in Maryland which will, I think, show why the railroads are being compelled to do what they might have done or should have done years ago. About the middle of the month I had occasion to go from Cumberland, Md., to Hagerstown, a distance of 66 miles, for which I paid $2.30 on a bus. From Hagerstown to Washington, a distance of 72 miles, I paid $2.48. That was 138 miles, which cost me $4.70, and you will find that will figure 3.4 cents a mile. The railroad rate, as you all know, is 3.6 cents a mile. For the mileage which I traveled it cost me a little less than 28 cents from Cumberland to Washington than the railroad fare. Now, the railroads were compelled to take off trains because they lost their passenger traffic to bus lines. If the railroads were to try to get back that traffic at 3.6 cents per mile they could get it if the bus lines were compelled by the Interstate Commerce Commission, or some other political agency, to maintain that rate. The railroads could get back the business, but every one knows that if the railroads were to put on trains that would get the traffic back, at no matter what rate, the bus lines would then again cut their rate so low that they could get the traffic back to the highways and the railroads would have another experience.

The same thing will apply to L.C.L. shipments that our speaker referred to. The truck lines are not responsible to any one and they can make any rate they please. They can take the traffic away from the railroads, because every one in this room and all other people of the United States build and maintain highways which the trucks and busses may use without any charge except for the licenses in the various states in which they originate, and on the gasoline which they use. Now that is an injustice to the railroads. It is unfair, and I have been trying for the past three years to get the supply men of these United States to look at it from the same viewpoint which I do. The political agencies to which we are subject have built highways and are maintaining them without a proper restriction upon the traffic which uses the highways almost free. I want to urge all to get in touch with the newspapers and Chambers of Commerce, and organizations of various kinds, and give them a knowledge and an understanding of how their money is being used to destroy the railroad industry. All the movements for past thirty years have been for the purpose of forcing the railroads into government ownership, starting in 1913, with the LaFollette Act for the valuation of railroads, which has cost this country $180,000,000 up to the present time, of which $140,-000,000 was collected and paid by the railroads and $40,000,000 by the rest of the country. The speaker of the evening has shown us that they must make collection and delivery from the store door. That makes every one, whether he is a security holder of the railroads or whether he is a citizen that never uses the railroads or the highways contribute, because the taxes are collected from every one regardless of whether he thinks he pays taxes or not. I want every one to look at it from that point of view, that we are all suffering, because we are all being compelled to pay a subsidy to destroy the railroads.

PRESIDENT: I think all of us, at least all railroad men, will agree with everything Mr. Gilg has said.

MR. E. S. GLAUCH (Mechanical Engineer, Joseph Dixon Crucible Company): The question I have in mind is as to how late we can call the railroad and have the freight moved out the same day. Suppose we call the railroad as late as one o'clock, is it possible to have the freight picked up that same afternoon?

MR. E. A. FOARD: Yes sir, if it is ready at one o'clock we pick your freight up and get it out of Pittsburgh the same day it is picked up. No matter where it is (and I understand you are referring to Jersey City, N. J.), if we have store door collection and delivery in effect in that city, we will pick it up and despatch it the same day we pick it up.

MR. GLAUCH: The reason I asked the above question was, occasionally we receive telegraphic orders and while our factory either has the material in stock or can prepare it for immediate shipment, our own trucks, which leave our plant with a load in the morning, often do not return until 3 o'clock or after. Frequently our Traffic Department has advised that even though they have a truck available at that time, by the time they would get the merchandise to the freight station it would be too late for their accepting inasmuch as they stop receiving less than carload freight about 4 o'clock. I might add that our plant is located in Jersey City, N. J., and not in Pittsburgh.

MR. FOARD: That is not correct. In the Pittsburgh district a 3 o'clock 'phone request cut-off time for pick-ups is in effect and a 2:30 P. M. 'phone request cut-off time for pick-ups in East Liberty and the North Side and in surrounding territory to insure dispatching same day, and if we get a telephone request for pick-up in downtown Pittsburgh at 2:30 or 3:00 P. M., we will pick your freight up and get it to the freight station and load it out the day we pick it up.

MR. GLAUCH: This would compare with service given by motor freight companies who when called up until noon, will arrange to pick up freight before our factory closes at 5 o'clock. On a number of occasions where the trucker found he could not get to our plant before 5 o'clock, he would call us and we would make arrangements in order that he could pick up the freight after 5 o'clock.

MR. FOARD: Phone our Freight Agent there before 3:00 P. M. any day and we will pick your freight up and get it out on time that day. Of course we will pick up your freight at any hour, but if your call is after 3:00 P. M. while we will try we cannot assure you that your freight will be dispatched by rail the same day.

MR. GLAUCH: We would like this quicker delivery mentioned by Mr. Foard inasmuch as future or repeat business with us often depends upon prompt delivery service inasmuch as we are many times competing with local concerns for business, the local concern making delivery from their plant to the customer by their own truck whereas our material shipped from Jersey City, is usually sent by railroad freight.

MR. FOARD: When you speak of freight from Philadelphia to Pittsburgh the next morning, often the truck gets into Pittsburgh about noon and by the time the freight is sorted you get second morning delivery from Philadelphia to Pittsburgh by truck. We find that, particularly in the case of some of these truckers applying to the Public Service Commission for certificate to enable them to operate in the State of Pennsylvania. We can give from Philadelphia to Pittsburgh dependable second morning store door delivery, or freight station delivery as desired by our patrons. You give us your business and we will handle it for you right.

MR. GLAUCH: (Supplemented) Since returning to Jersey City and discussing the pick-up and delivery service with our Traffic Department, I find that they have already, in many cases, taken advantage of this service. I also find that some of our customers request on their orders "Delivery Service."

PRESIDENT: Mr. W. S. McAbee, Vice-President, Union Railroad, may we hear from you?

MR. W. S. McABEE: I have nothing to offer.

PRESIDENT: Mr. Harry Sheets, Traffic Manager, Montour Railroad, have you any comment to make on the paper?

MR. HARRY E. SHEETS: I have no question to ask concerning the service recently instituted by the P. R. R. but I do wish to give expression to one thought relative thereto. Its inauguration, the actions taken by the carriers that have adopted it, shows that one of the things responsible for a great many of the losses sustained by the carriers has been lack of co-operation. United efforts, concentration and consideration will solve or partly solve many difficulties.

PRESIDENT: Mr. Snyder, Vice-President and General Manager, Bessemer and Lake Erie, may we hear from you?

MR. F. I. SNYDER: I think this is a very interesting experiment, as the speaker called it. It is being watched by railroad transportation people all over the country. I think there is an indication that some of these subsidies for competing transportation are going to be considerably reduced in various ways, and that ought to help out store door collection and delivery.

MR. FOARD: In that connection it may be of interest to note that here in Pittsburgh and in the few months that we have had this service in effect, from very humble beginnings, in one week alone during April we delivered 5,500 shipments, 2,000,000 lbs. of L.C.L. freight. And our patrons are becoming accustomed more and more every day to this new service. They are starting to realize its advantages to them, and that together with the new trucking code and stricter regulation of trucking in the State of Pennsylvania I think will have a marked effect on our competitive trucker friends and help largely to overcome some of the difficulties the gentleman talked about here a few moments ago.

PRESIDENT: Mr. L. M. Keck, of the Baltimore and Ohio Railroad, we would like a word from you.

MR. L. M. KECK: I do not know that I have anything to say, except that I have heard a great deal about trucks, and not a thing about the rivers.

MR. FOARD: How much L.C.L. freight was handled on the river?

MR. KECK: A million tons in 1931 on the Monongahela River and a total of over 28,000,000 tons last year. Give us the water tonnage, and we will not miss the truck business.

PRESIDENT: Mr. A. J. Keeling, of the Mesta Machine Co., how does this question affect the shipper?

MR. A. J. KEELING: The shippers talked this over just ten years ago. They could tell what was coming. I would like to ask Mr. Foard whether this service is arranged to the rail end of the L.C.L. only. For example, are you carrying the freight by truck only to the same freight station or are you taking advantage of trucking the same freight the whole movement?

MR. FOARD: That is a natural development for the future. At the present time, as I said before, under this arrangement the carrier has the option of handling the freight for a consignee or shipper who has an industrial siding in ferry car service or by truck. In some cases it is more economical to the carrier to handle that freight by ferry car service.

Now while we are on that subject, while it was said that we are ten years behind the times, we are not really that far behind with all our shippers, because those shippers who have industrial sidings at least have been using store door delivery from the railroads for a good many years. Store door collection and delivery has been in effect in Europe for many years and 25 or more years ago the service was in effect on the Pennsylvania Railroad at Baltimore and Washington, D. C.

PRESIDENT: I see another Pennsylvania Railroad man back there, Mr. Sixsmith.

MR. G. M. SIXSMITH: Mr. President, this subject of collection and delivery service is very interesting and important, and I feel its discussion here tonight is timely. It is interesting because it is a new development in rail transportation and the co-ordination of rail and truck service. It is important because there is a growing demand on the part of the public for freight service handled by one agency to and from the place of business of industries. However, the success or lack of success of this plan rests entirely on the use that is made of it by the shipping public, and therefore I would like to yield any opportunity and time involved to discuss this subject, to the shippers and receivers of freight who may be represented here. I think Mr. Foard would rather hear from them than from me or any other of his associates on The Pennsylvania Railroad, as anything I could say about the plan would be largely a repetition of what he has already stated in what I consider a full and comprehensive manner, and I know that he and the rest of our Pennsylvania Railroad people here would appreciate comments from representatives of industries who have heard the outline of the plan by Mr. Foard.

PRESIDENT: This is a subject that should be particularly interesting to them and we would like to hear from any one who can give us that side of the question.

PRESIDENT: Mr. Kramer, have you any comments to make?

MR. W. E. KRAMER (Acme Steel Co.): Mr. President, I have listened with a great deal of pleasure to the speaker of the evening. His address was clear and interesting. I haven't anything to offer but I am glad to be here.

PRESIDENT: Mr. J. B. Baker, Chief Engineer, Pennsylvania Railroad, will you say a word on this subject?

MR. J. B. BAKER: I was just wondering whether it might not be of interest to all of us to have Mr. Foard tell us to what extent this same service is being rendered in the eastern part of the country by other railroads.

MR. FOARD: There is but one of the eastern trunk line railroads other than the P. R. R. rendering this service. The service is in effect on the Erie Railroad, on the Nickel Plate Railroad, on the C. & O. Railroad. The major eastern trunk lines, such as the New York Central, the B. & O., the Lehigh Valley and the Lackawanna, have not yet adopted this service.

I would like to say something else but I am afraid I would be accused of some more sales talk for the Pennsylvania so I will not.

PRESIDENT: Mr. Flinn, will you close the discussion?

MR. R. H. FLINN: Mr. Chairman and Gentlemen: We have heard something a little new this evening from Mr. Foard, and I want to point out that we have heard something new in the railroad industry—and we have been accused, somewhat carelessly, of never having any new ideas in the railroad business. We have a new idea in this collection and delivery service, or at least a new development of the idea. If you want to know anything about it just ask Mr. Foard. And I want to say that we are much indebted to him for coming here this evening and giving us this fine exposition of store door collection and delivery of freight, and I move that we express our appreciation by a rising vote of thanks.

The motion was duly seconded and prevailed by unanimous vote.

PRESIDENT: If there is no further business the meeting will stand adjourned and we invite you to the luncheon which has been prepared at the rear of the room.

J. D. CONWAY, Secretary.

In Memoriam

C. W. CALDWELL

Joined Club October 25, 1928

Died February 22, 1934

CHARLES E. HALE

Joined Club September 25, 1919

Died April 16, 1934

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. MAY 24, 1934. No. 7.

THE OXYACETYLENE PROCESS AS APPLIED TO RAIL MAINTENANCE

By C. A. DALEY, Maintenance-of-Way Specialist, Applied Engineering Department, Air Reduction Sales Company, New York, N. Y.

OFFICIAL PROCEEDINGS
OF
The Railway Club of Pittsburgh
Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 7.

Pittsburgh, Pa., May 24, 1934

$1.00 Per Year
25c Per Copy

INDEX—ADVERTISERS.

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Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

MAY 24th, 1934

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock, P. M., with President C. O. Dambach in the chair.

Before going into the business meeting a delightful program of songs was presented by Miss Mary Elizabeth Dickinson, accompanied at the piano by Mrs. T. R. Dickinson, her mother.

At the close of the recital Past President J. G. Code moved that the pleasure the Club has had in listening to this beautiful music be expressed by a rising vote of thanks to Miss Dickinson and her mother for the most enjoyable entertainment they have brought to us. The motion prevailed by unanimous vote.

At the close of the recital the business session was called to order.

The call of the roll was dispensed with as the registry cards furnish a complete record of the attendance.

The reading of the minutes of the last meeting was by common consent dispensed with as the minutes have been printed and the Proceedings are now in the mail.

Attendance, as shown by registration cards collected at door, 187, as follows:

MEMBERS:

Allen, Harvey
Baker, George N.
Baker, J. B.
Barr, H. C.
Batchelar, E. C.
Beam, E. J.
Braun, O. F.
Buffington, W. P.
Burgham, M. L.
Campbell, J. E.
Cannon, T. E.
Carlson, L. E.
Carr, T. W.
Carruthers, G. R.
Christy, F. X.
Church, S. L.
Clements, Frank C.
Code, J. G.
Conway, J. D.
Courtney, H.
Cruikshank, J. C.
Dambach, C. O.
Davin, W. E.
Davis, Charles S.
Dickinson, T. R.
Dempsey, P. W.
Donovan, J. J.
Ekey, J. S.
Emery, E.
Emsheimer, Louis
Endsley, Prof. Louis E.
Farrington, R. J.
Flinn, R. H.
Forsberg, R. P.
Frauenheim, A. M.
Freshwater, F. H.
Furch, G. J.
Gillespie, J. Porter
Gleeson, H. L.
Glenn, J. H.
Goda, P. H.
Goron, F. W.
Haller, Nelson M.
Hansen, William C.

Harman, H. H.
Hill, W. D.
Hilstrom, A. V.
Hohn, George W.
Holmes, E. H.
Honsberger, G. W.
Hursh, S. R.
Johnson, J. W.
Keller, R. B.
Keller, R. E.
Kentlein, John
Kirk, W. B.
Kraus, Raymond E.
Kroske, J. F.
Kruse, J. F. W.
Layng, F. R.
Lincoln, J. J., Jr.
Longdon, C. V.
Lowry, William F., Jr.
Lynn, Samuel
Maliphant, C. W.
Misner, George W.
Mitchell, W. S.
Montague, C. F.
Morgan, A. L.
Morgan, Homer C.
McKinley, John T.
McNamee, W.
Noble, J. A.
Noonan, Daniel
Orr, D. K.
O'Sullivan, John J.
Page, A., Jr.
Palmer, E. A.
Peabody, R. T.
Pickard, S. B.
Purchard, Paul
Redding, P. E.
Ryan, Frank J.
Schadt, A. D.
Schaller, A. J.
Seiss, W. C.
Semmer, M. R.
Severn, A. B.
Snyder, F. I.
Stein, J. A.
Stucki, A.
Sutherland, Lloyd
Swope, B. M.
Thomas, Theo.
Tomasic, N. M.
Trax, L. R.
Triem, W. R.
Van Horne, C. L.
Van Vranken, S. E.
Warfel, John A.
Weaver, W. Frank
Wheeler, C. M.
Woods, G. M.
Woodward, R.
Wright, Edward W.
Wurts, T. C.
Yarnall, Jesse

VISITORS:

Barnstable, Joseph
Baughman, G. W.
Bibbee, G. C.
Bradley, H. J.
Brown, W. E.
Callahan, D. E.
Callahan, D. E., Jr.
Cashdollar, Roy G.
Chambers, Charles
Code, C. J.
Cotton, C. S.
Cox, George P.
Crossland, P. B.
Dahlinger, A. C.
Davis, William B.
Dickinson, Mary E., Miss
Dickinson, T. R., Mrs.
Eaton, Frederick H.
Edsall, S. D.
Farlow, G. B.
Farrington, R. S.
Flad, E. D.
Follett, W. F.
Furch, G. J., Jr.
Geisler, Edward W.
Geist, Eugene
Gemmell, J. F.
Gilbert, E.
Gillespie, J. W.
Henriques, H. F.
Hocking, Harry A.
Hope, R. O.

Horchler, Henry D.
Joyce, S. F.
Kalb, J. A.
Kentic, J. W.
Kerchansky, Steve
Kinne, M. W.
Korth, A.
Kroll, Joseph A.
Law, B. N.
Lewis, S. B.
Livingston, E. M.
Martin, G. G.
Meredith, A. R.
Murray, T. J.
Nossel, P.
Osterrieder, A. J.
Prendergast, J.
Radthe, J. E.
Read, A. A.
Robinson, H. J.
Rumbarger, F. A.
Russell, L. A.
Ruzzi, A.
Sawyer, R. Tom
Schott, F. J.
Severn, H. A.
Sexton, E. W.
Shaw, Lawrence C.
Shuster, N. W.
Smith, Sion B.
Sonnett, A. F.
Stevenson, William
Strople, G. H.
Sullivan, E. F.
Sutherland, O. C.
Teeple, B.
Terkelsen, B.
Thompson, H. C.
Vandivort, R. E.
Walker, Thomas M.
Watson, J. R.
Welson, L. E.
West, Emmet
West, N. J.
White, Charles G.
Williams, John R.
Wilson, George F.
Yohe, S. K., Jr.

The Secretary read the following list of proposals for membership:

Baughman, G. W., Engineer, Union Switch & Signal Company, 100 West Hutchinson Street, Edgewood, Pa. Recommended by Professor Louis E. Endsley.

Crow, C. C., Supervising Agent, Pennsylvania Railroad, 7725 Cannon Street, Swissvale, Pa. Recommended by J. G. Dennis.

Daley, C. A., Engineer, M. of W., Air Reduction Sales Company, 60 East 42nd Street, New York, N. Y. Recommended by C. O. Dambach.

Foard, Edwin A., Superintendent Stations and Transfers, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Hocking, Harry A., Representative, Air Reduction Sales Company, 60 East 42nd Street, New York, N. Y. Recommended by R. P. Forsberg.

Lincoln, John J., District Manager, Air Reduction Sales Company, 1116 Ridge Avenue, N. S., Pittsburgh, Pa. Recommended by J. D. Conway.

McCracken, C. M., Freight Agent, Pennsylvania Railroad, Eleventh Street Freight Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Noonan, Daniel, Sales Representative,, Air Reduction Sales Company, 1116 Ridge Avenue, Pittsburgh, Pa. Recommended by J. D. Conway.

Sexton, E. M., Railroad Sales Manager, Air Reduction Sales Company, 60 East 42nd Street, New York, N. Y. Recommended by Professor Louis E. Endsley.

Van Horne, C. F., Applied Engineering Department, Air Reduction Sales Company, 6328 Wellesley Avenue, Pittsburgh, Pa. Recommended by S. E. Van Vranken.

PRESIDENT: In accordance with the provision of the By-laws these proposals will be referred to the Executive Committee and upon approval of that Committee the gentlemen will become members without further action of the Club.

If there are no announcements, that ends the business part of the meeting and we are ready for the paper of the evening. We have with us tonight Mr. Charles A. Daley, Engineer, Air Reduction Sales Company, New York, who will address the Club on the subject: "Maintenance of Way Welding." This is a subject that should be very interesting. It is a long time since we have had a maintenance of way paper—possibly the first we have had on welding—and it gives me a great deal of pleasure to introduce a man who is past master in the art of this new industry, Mr. Daley:

THE OXYACETYLENE PROCESS AS APPLIED TO RAIL MAINTENANCE

By C. A. DALEY, Maintenance-of-Way Specialist, Applied Engineering Department, Air Reduction Sales Company, New York, N. Y.

INTRODUCTION The paper that I shall read tonight and the lantern slides and motion picture which will be shown following it will deal chiefly with the reconditioning of rail ends by the oxyacetylene process. Other uses of the torch, such as frog and switch point welding, signal bonding, pipe welding, cutting, etc., will be mentioned only briefly.

The process of heat treating rail ends, which was conceived and promulgated by the Air Reduction Sales Company as a means of preventing rail end batter, will also be touched upon.

HISTORICAL The first all-iron rail used in this country was on the Camden-Amboy Railroad in 1848. This rail was 7 inches high and had a base 4⅝ inches wide. It was thought at the time that the rail problem had been solved, as this was apparently a distinct improvement over the iron-topped wooden rail then in use. But it was soon found that the all-iron rail battered very badly at the ends and this in turn caused considerable shock and damage to the rolling stock, such as it was at that time. After a few years this rail was replaced with the old iron-topped wooden rail.

This was the first instance of rail batter in this country; a problem which today still is confronting the railroad engineers. In 1848 they took the rails out, but today, with the aid of the oxyacetylene welding torch, battered rails are being built up in the track without interruption of traffic.

NATURE OF PROBLEM A 130-pound section rail in place in the track is worth approximately $35. You can, therefore, readily appreciate the amount of money a maintenance engineer must provide for in his budget to take care of the single item of rail. Then, too, there are the numerous crossings, frogs and switches which must be maintained. Naturally, therefore, he is interested in getting the longest possible life out of all this material, consistent with safety and good riding track.

When rail ends begin to batter and go down, maintenance expense begins to go up. The battered ends cause excessive wear in the bolts and angle bars, loose joints, shattered ties and rough riding track. Even the ballast is dislodged by the hammering of the car and engine wheels as they pass over the battered joints. When this stage of batter has developed, it is necessary for the section men to pay frequent attention to the joint. Bolts must be tightened, joint bars renewed, if badly worn or broken, and the joint tamped up, or even worse conditions, such as wide gauge and poor line, will occur.

VALUE OF OXYACETYLENE PROCESS The oxyacetylene torch at one time was considered more or less a tool to be used only in the railroad shops. But today it plays as important a part in the Maintenance-of-Way Department as in the mechanical or car departments. It is practically indispensable in track maintenance.

To illustrate the value of a welding torch in building up rail ends, suppose a battered joint has developed and it is desired to correct the bad condition, and no welding torch is available. It would be necessary to replace two rails. This would involve trucking two suitable rails to the location and removing the rails taken out, a pair of joint bars, probably two new bolts and a few spikes. And, in addition to the section men, signal men would probably be on hand to bond the three joints affected. To do all this an expenditure of approximately $50 including charge for rail would be incurred.

With a welding torch and the proper welding rod, the condition could be remedied for approximately $1 and the repaired or reconditioned joint would be better than when new, because the welding rod now used for this class of work will produce a better wearing joint than new rail.

NOW STANDARD PRACTICE Not so long ago it was considered almost suicidal by a great many prominent railroad engineers to have a rail in the track which had been heated to any extent after the rail had left the rolling mill. The practice of bending a rail cold was permitted but the application of heat to a rail was tabooed.

Undoubtedly, it was this prejudice as much as anything which prevented the ready acceptance of the welding torch in the reclamation of frogs and switch points and the reconditioning of rail ends.

Today, the practice of building up open hearth steel frogs, switch points and rail ends is accepted as standard by practically every railroad in this country. But even yet an outcropping of the old prejudice against heating a rail end can be found in certain quarters.

As the practice of rail end welding and the reclamation of frogs and switch points became more generally accepted better welding rods were developed to meet the severe service to which these track members are subjected in main line service.

CAUSE OF BATTER Some maintenance-of-way engineers maintain that they do not have any battered rail ends; that by proper joint maintenance rail batter is prevented. There is no question but that good joint maintenance will tend to retard rail batter but it will not prevent it, if there is any great volume of traffic over the rails.

This is due to the fact that the concentrated load of the heavy motive power and loaded cars transmitted to the rail through the small area of contact between the wheels and the rail sets up a stress greater than the elastic limit of the steel in the rail. This results in what is generally known as cold flow of metal.

Along the top sides of the ball of the rail a bead is formed by this cold flow of metal. At the ends of the rails a lip is formed.

Naturally, therefore, at the ends of the rails where the metal can push out over the end, in addition to flowing to the sides, the ends of the rails will show a depression or batter. When once the depression is started, the hammer blows resulting from the wheels dropping into the depression accelerates the rate of batter. Poor joint maintenance also helps the batter along.

Some few rails are found that seem to resist batter very well, but the majority of rails do batter more or less readily.

FLEXIBILITY AND PORTABILITY OF PROCESS The flexibility of the oxyacetylene welding process and the portability of the equipment required with this process make this an ideal method of reconditioning rail ends, rebuilding frogs and switch points and the heat treatment of rail ends.

No large investment is required to outfit an oxyacetylene welding gang—no heavy depreciation and repairs to consider, no gang delays on account of failure of equipment and no heavy and bulky equipment to transport or to obstruct traffic.

METHODS USED The oxyacetylene process affords two distinct methods of reconditioning rail ends. These methods are known as "Reforming" and "Aircowelding." They can be used separately and independently of each other, or if conditions warrant, the two methods can be used jointly in reconditioning rail ends.

WHERE RECOMMENDED The reforming process is recommended for reconditioning rail ends when only a slight amount of batter exists. As a rule rail ends with 3/32-inch or less batter can be reconditioned without the addition of any welding rod unless of course the rail end is chipped, in which case metal is added.

The Aircoweld process is recommended when the batter exceeds 3/32-inch or where a long batter exists.

DESCRIPTION OF REFORMING PROCESS The reforming process for reconditioning rail ends not only produces a very satisfactory joint, but permits of a larger output of joints per day per man. This results in a lower unit cost per joint than the ordinary methods of welding, especially when only a small amount of batter exists. The procedure in this operation is as follows:

1. A straight-edge is laid across the joint to determine the extent of the batter. The limits of the batter are then marked on the rail or a mental record made by the operator. The operator then heats the center of the rail to a forging heat within the limits of the batter. A flatter is then placed against either side of the ball of the rail and the helper strikes the flatter with a sledge as it is moved back and forth along the side of the ball of the rail within the limits of the heated area. This will raise the surface of the rail in the heated area.

2. Heat is then applied to the rail head more or less in the shape of a letter U with the open end of the U toward the end of the rail, thus heating the rail head on either side of the center. The flatter and sledge is again brought into play as before. This will raise the surface of the rail from the center out toward the sides. The completion of this operation will bring the rail up to the desired surface except at the end of the rail where the batter is always the greatest.

3. The next operation is to heat across the rail an inch or so from the end. A hot cut chisel of the proper thickness and about 2¼ inches wide is driven between the rail ends. This will raise the surface of the rail at the end and produce the desired bevel at the end of the rail.

4. A straight-edge is then placed on the rail to locate any low spots. If any are found a small amount of metal is added.

5. The whole end of the rail is then heated and a finished surface made by the use of the flatter and sledge.

6. The other rail end forming the joint is then worked in the same manner. Upon the completion of the reforming of this rail end the two rail ends are heated and brought to the same height by working the flatter across the joint.

On a completed joint the straight-edge should swing freely from the junction of the two rail ends while the rail is hot. Upon cooling, the joint will be level. In this method of reconditioning rail ends, as in any other by the oxyacetylene process, any loose metal is readily detected when heat is applied. If any shows up it should be melted out and new metal added.

DESCRIPTION OF AIRCOWELDING PROCESS This method of reconditioning rail ends differs from the reforming process in that the rail ends are brought up to surface by the addition of metal. Aircowelding also differs from puddle welding in that the surface of the rail is not broken down as in puddle welding but instead a surface fusion technique is employed. The procedure in this operation is as follows:

1. The surface of the rail is heated quickly to a fusion temperature.

2. The adding material is applied as soon as this surface fusion condition is observed, without puddling the metal. This permits a quicker start in the application of the adding material, less heat penetration and effects a considerable saving in oxygen and acetylene consumption on account of the speed of the application of the rod in this process.

The Aircowelding process is especially well adapted to building up rail ends when a ground joint is desired. With a little experience a welder can flow the adding material so smoothly and evenly that very little grinding or flatter work is required to make a finished surface.

In making an Aircoweld on a rail end, a welder can carry a bead 2 inches or more wide without any difficulty, which is impracticable to do with the puddle weld. While it is possible to Aircoweld with a single flame tip and effect a considerable saving over the puddle weld method, a new multi-flame tip has been developed to further increase the speed of Aircowelding. A welder can make and flatter-finish welds on 130-pound rail ends at the rate of 1 inch per minute without difficulty, using the multiflame tip. For grinder finish the rate of application of the adding material is even greater.

COMBINATION METHOD For out-of-face welding, a combination of Aircowelding and reforming of rail ends is the most economical method of reconditioning rail. It is well known that all rails, in almost the same identical service, do not develop the same degree of batter, and it is for this reason that both methods of reconditioning rail ends are recommended.

PREPARATORY WORK Regardless of the method used in building up or reconditioning rail ends, there is a certain amount of track work, such as surfacing joint, applying new or reformed joint bars where necessary, renewing poor joint ties, tightening all bolts and so forth, which should be done ahead of the welders to assure the best results.

If it is found to be out of the question to do all this work ahead of the welder, at least the joints should be surfaced and the bolts tightened before welding.

PRESENT TREND OF TRACK WELDING A committee of the American Railway Engineering Association on the subject of "Methods of Reconditioning Rail Ends, Fastenings, Frogs and Switches in Tracks," recently sent out a questionnaire to a number of railroads and made a compilation of the returns. The twenty-four railroads that reported to the Committee are among the largest in the United States and Canada, and represent all sections of the country. Therefore, the information developed may be taken as fairly representative of the present trend of track welding. Some interesting facts deduced were as follows:

1. Of all the railroads reporting 50 per cent use oxyacetylene welding only; two roads report arc welding only, and the remainder use both arc and gas welding.

2. During the year 1932, approximately 85 per cent of all the joints built up were reconditioned by the oxyacetylene process.

3. The amount of batter determining when welding should be done varies according to opinion, from 1/32-inch to ⅛-inch. However, the majority of the railroads reporting indicate that rail ends with batter of 3/64-inch require welding. It is obviously not good policy to let rail batter develop to the maximum permissible extent before welding. The labor cost of maintaining good surface where battered rail exists for a relatively short period is many times more than that of reconditioning the rail ends. Not only are maintenance costs reduced and the life of the rail materially extended, but it is a long step toward the goal all track maintenance men are striving for; that is, good riding and safe track.

4. For the year 1932 the largest number of joints built up by a single railroad, using the electric process only, was 170,645. The largest number reported by a single railroad using the oxyacetylene process only was 229,103 joints. The largest number of joints welded by a single railroad reporting the use of both the arc and the oxyacetylene process was 297,079. Of these, 215,029 were welded by the oxyacetylene process and 82,050 by the arc process.

5. About 30 per cent of the roads using the oxyacetylene process report the use of grinding machines on some of the work. All using the electric process report using grinders, usually one grinder for each arc.

6. There seemed to be considerable variation in the cost of building up rail ends, depending primarily on the amount of batter and length of weld; also whether or not the rail ends are built up out of face or spot welded. The cost range for oxyacetylene welding was $0.43 to $1.50 per joint; for arc welding, $0.88 to $2.10 per joint.

HEAT TREATING RAIL ENDS While the process of heat treating rail ends is a recent development in the application of the oxyacetylene process to rail maintenance, it has been in use sufficiently long to prove its effectiveness in preventing rail end batter. This is substantiated by the fact that several of the largest railway systems have accepted the Airco process of heat treating rail ends as standard practice and are now heat treating reconditioning rail ends as well as new rail.

In the process of heat treating rail ends the pearlitic structure of the steel is changed to the tougher and harder sorbitic structure. This is accomplished by heating the ends of the rail quickly and uniformly to a temperature of 1500 degrees F and then quenching with water to a temperature of approximately 300 degrees F. The rail ends are then reheated to a drawing temperature of 650 degrees F and allowed to air cool.

The operator soon becomes very proficient in determining the quenching temperature by the heat color of the rail end. Too much should not be left to the eye, however. A pyrometer should be used to determine the quenching and drawing temperature, especially until the operator has had considerable experience and is sure his judgment is correct. Even then the pyrometer should be used freely as a check.

The drawing temperature is easily checked by striking a piece of 50-50 solder across the rail end. If the solder melts freely and oxidizes slightly in a few seconds, causing it to become straw colored, sufficient heat has been applied. If the solder remains bright more heat is required.

The drawing temperature can be checked by placing the points of the pyyrometer in the molten solder.

A suitable sprinkling can for quenching may be made by punching a dozen or so small holes in a two-quart pail or can.

FROG WELDING Frog welding, like rail end welding, can be done in the track. However, at points where the traffic interruptions are frequent, it is better to replace the frog and do the welding outside.

A frog that has been given ordinary maintenance attention, that is the bolts kept tight or renewed when broken so that the bolt holes and filler blocks are in good shape, can be welded several times.

SWITCH POINT WELDING The switch point, unlike other parts of the track structure, presents only a thin fin of metal to withstand the abrasive effect of the car and engine wheels. Epecially is this true of the deflecting points.

A switch point built up against a worn stock rail will outwear a new point in the same location, for the reason that the built-up point will have the proper height and contour for the worn stock rail.

TRACK BONDING The most essential thing in automatic signaling and train control is a good electrical circuit in the track. If the track bonding is poor, trains will be delayed and battery consumption will be excessive.

The wire pin connected bond was used exclusively in bonding rails for automatic train signaling until a few years ago. Now the fusion bond is rapidly replacing the wire bond.

The welded bond is shorter than the wire bond and, hence, gives greater protection. With a wire bond a rail could be broken at the end of the angle bars, or the whole head of the rail within the limits of the angle bar could be broken out, and yet the track circuit could be intact and a clear signal indication given. With the welded bond applied on the head of the rail and at the very ends of the rail complete protection is afforded.

The resistance of a welded bond is about 1/90th that of the common wire bond. Therefore, the battery consumption is reduced materially, resulting in a saving ranging from $35 to $90 per mile of track per year.

CONCLUSION There are many other operations involving the use of the oxyacetylene torch in maintenance-of-way work, such as pipe welding, and repairs to bridges, motor cars, switch stands and track tools. All of these save the railroads considerable expense but are beyond the scope of this paper. However, I do not know of any place where an oxyacetylene welding torch will pay greater dividends to a railroad than when used in rail maintenance.

PRESIDENT: I think there is no question in the mind of anybody as to the value of rail welding, provided it is properly done. Mr. Daley has shown us that it can be properly done, and he is here to answer any questions and tell you how to do that same kind of job on your own railroad. It is a very interesting subject and I know you will have a great many questions to ask Mr. Daley.

MR. R. TOM SAWYER: The subject is a little out of my line, being in the locomotive game, but I would like to ask a question. How much welding have you done in welding the rails together.

MR. DALEY: Butt welding?

MR. SAWYER: Yes, butt welding the rails together. For long distances?

MR. DALEY: We have done quite a lot of that, especially through station platforms and road crossings.

MR. SAWYER: You do not have it on main line?

MR. DALEY: Yes, that is in main line track.

MR. SAWYER: Is that for a 100-mile stretch?

MR. DALEY: Oh, no. At one road we are welding about a mile and a half or something like that through a tunnel.

MR. SAWYER: What lengths do you weld?

MR. DALEY: Whatever the rails happen to be. You mean through the station platform?

MR. SAWYER: If you are going a mile and half through a tunnel. Do you weld the rail till you get a length of 250′ or something like that?

MR. DALEY: They weld as high as 600′.

MR. SAWYER: I know a good many go up to 800′ and others will not go 400′.

MR. DALEY: I know of one stretch that was put in a mile long.

MR. SAWYER: Incidentally it would eliminate some of the work you do because there would be less joints to maintain. When you do have a joint you have to pay special attention to it.

MR. DALEY: I know of one place where there was approximately a mile that was thermit welded, not acetylene welded. In the very severe winter we had in New York state this year there were seven broken rails. There was no expansion allowed at the rail joints, as there should have been.

MR. OWEN SHAW: What distance would be advisable to weld the rail with open track, not in a tunnel?

MR. DALEY: I am not in position to say. There has been very little of that done and it would be only a guess. We have it in station platforms 500 or 600 feet.

MR. C. M. WHEELER: What increase in the life of the rail would you expect from welding in that manner?

MR. DALEY: Roughly I would say 50%.

MR. WHEELER: Would one weld be the life of your rail?

MR. DALEY: It would be three welds, depending on the kind of job. If it is welded and heat treated you would get 50% increase in life without further welding.

MR. W. R. TRIEM: While it would require another evening and a paper of about the same length as was presented by Mr. Daley to fully cover the matter of heat treatment of rail ends, I should like to ask one question, which I hope will not unduly delay the proceedings. Does the heat treatment of rail ends materially affect the life of the rail end, if so, to what extent?

MR. DALEY: You are right. The matter of heat treatment of rail ends is a big subject. However, answering your specific question, life of rail is increased from 50% to 100% by heat treating the rail ends.

MR. F. I. SNYDER: Mention was made in the paper of both building up or conditioning the rail ends and heat treating. I did not understand whether this is done in the same job. When the rail end is built up by welding can it also be heat treated?

MR. DALEY: Yes. Heat treating can be done when the rail is hot, and you save that heat.

MR. F. R. LAYNG: Isn't it a fact that the general practice is to prohibit the cutting of rails with a torch?

MR. DALEY: There are some roads that do not permit the use of a torch in cutting main line rails.

MR. LAYNG: And a few heat treat too far back from the end of the rail, do they not?

MR. DALEY: 2½″ to 3″ is the present practice.

Ordinarily when you get the rail from the mill there is a fin on the rail from the saws. If the rail is in traffic any length of time before heat treating you can remove the fin very easily by scarfing the rail.

MR. LAYNG: Is it your opinion that the heat treating should be done before?

MR. DALEY: Personally I would like to see a few days use in the track and then heat treat it, but I would not want to wait too long.

MR. LAYNG: Is it your opinion that it is necessary to grind the rail before heat treating it?

MR. DALEY: It is not necessary, but there is a slight variation in the heights of some rails. It would be better if the rails were ground to a uniform surface.

MR. LAYNG: Can you give us any idea of what heat treatment costs?

MR. DALEY: About 30 cents to 35 cents a joint, 130 pound rail.

MR. LAYNG: Is the grinding included?

MR. DALEY: Yes, the cross grinding will cost a cent or two.

MR. LAYNG: That seems low.

MR. DALEY: If you have your gangs well trained you can heat treat anywhere from 150 to 200 rails a day with three men.

MR. LAYNG: Can you tell us about what you can expect in the way of heat treatment?

MR. DALEY: We strive to get 350 Brinell hardness. It will vary a little one way or the other from that.

MEMBER: Have you experienced any trouble from frogs from heating, and can you overcome it?

MR. DALEY: Do you mean out of the track or in the track? Occasionally you do if you get too much heat in them. Sometimes they drive a wedge underneath to put a little strain in the center of the frog, and I have seen a truss used on the N. P. that seems to overcome the trouble.

MEMBER: Have you had any experience in trying to weld manganese frogs with a torch?

MR. DALEY: Yes.

MEMBER: Is it successful?

MR. DALEY: Not successful enough for us to recommend it.

MEMBER: I notice one of the pictures on the screen showed a patch.

MR. DALEY: That was a brazing operation, using a flux and our No. 20 bronze.

MEMBER: What is the difference in penetration between the two flame and the three flame nozzle.

MR. DALEY: I have not seen any etchings. I imagine it is a little less in the three flame tip.

MEMBER: What penetration do you get from welding?

MR. DALEY: You get down pretty well, sometimes down into the web.

MR. S. E. VAN VRANKEN: While not connected directly with the railroads, I have a traveling man's interest in main line service and safety. Do you recommend welding of switch points in main line service.

MR. DALEY: No, I would not recommend welding switch points in main line service, although it is done to some extent. There are plenty of places where you can weld switch points without going to the main track. New points should be used in the main track. A good weld is safe but it is not the best thing to do.

MR. H. H. HARMAN: I understand you to say that by welding you could increase the life of the rail from 50% to 100%. Where do you get that?

MR. DALEY: From the American Railway Engineering Association, from a questionnaire they sent out to the various engineers throughout the country. That seems to be the opinion of the engineers.

MR. HARMAN: What is your own experience?

MR. DALEY: I have known rail that has been maintained in the track fifteen years longer than it would have been if it had not been for the torch, and when you get fifteen years' additional life out of the rail you are getting a pretty good life out of the rail.

MR. LAYNG: You say with a torch.

MR. DALEY: If you had to do it with a torch I would recommend a rod with about 13½% manganese.

MR. LAYNG: Do you recommend a torch on manganese work?

MR. DALEY: No, I would not recommend it for that.

MR. E. EMERY: How long does your welding of these joints hold up traffic between the welds when the traffic is going?

MR. DALEY: I should say until the metal is black. When the rail becomes black it will take the traffic. You can generally see a train coming, or hear it, in time to knock off welding so the rail will cool down.

MR. EMERY: That would leave a rough joint before the grinding.

MR. DALEY: It would not be rough enough to do any harm. With an oxyacetylene torch it is not rough like it is with the arc. We can keep it smooth as we go along.

MR. LAYNG: Are you familiar with the work the D. & H. are doing in welding?

MR. DALEY: I have seen it.

MR. LAYNG: That is thermit welding. In the work you mention on station platforms, I wish you would describe how that is done. That is not thermit welding?

MR. DALEY: No, that is butt welding with the torch.

MR. LAYNG: How is that done?

MR. DALEY: The ends veed up from the bottom and veed in on the sides up through to the web and then veed in on either side of the bail. Then start from the base and weld up to the top. We use our ordinary outfit which we use for rail end welding.

MR. LAYNG: And that is done with a torch?

MR. DALEY: Yes sir.

MR. LAYNG: Never with acetylene?

MR. DALEY: Oh yes, with the oxyacetylene torch. Then they generally put the bars back on.

MR. LAYNG: Then after this operation do they replace the bars?

MR. DALEY: Yes.

MR. LAYNG: Why is that done?

MR. DALEY: It is done for two reasons. One, in case the rail breaks you have some protection, the other for additional support.

MR. LAYNG: Is it proper to weld the rail ends if you do not have entire confidence in it?

MR. DALEY: The purpose of the weld is to eliminate the joint and not the bars. It is always hard to maintain a joint in a station platform or a crossing.

MR. LAYNG: Do you know of any process of thermit welding that would permit a weld sufficiently strong to rely on?

MR. DALEY: I do not know of any in use.

MR. W. E. BROWN: How is welding handled in the case of an insulated joint?

MR. DALEY: With an insulated joint it is necessary to remove the fiber insulation, otherwise you would burn out the fiber and destroy the insulation.

MR. BROWN: I asked that question because of what welders seemed to be doing in one of the pictures shown.

MR. DALEY: That was on a bond, a gas weld bond, showing protection where heat treating is being done.

MEMBER: What is the life of a rail after this treatment?

MR. DALEY: How much traffic? That depends on the amount of traffic you have. Some rail wears out in two years, some in six months. If you do not have any traffic it will last a long time.

PRESIDENT: Are there any other questions?

MR. DALEY: I don't know how many of you gentlemen realize what a spot you have put me on here. I notice in the audience one of my old professors at Purdue so I have had to be a little cautious about some of my remarks.

PRESIDENT: We would like to hear a word from Mr. Baker, Chief Engineer Maintenance of Way, Pennsylvania Railroad.

MR. J. B. BAKER: Just one or two questions. These are easy. Did I understand you to say that you should get a saving of 50% to 100% of the life of the rail by this process at a cost of $1.00 to $1.50 as against $50 for moving the rail?

MR. DALEY: Yes.

MR. BAKER: I think that is just a little heavy on the cost of moving the rail.

MR. DALEY: There are two rails involved.

MR. BAKER: I do not want to leave a wrong impression. I think welding is fine, but you cannot go out and weld one joint for the figure you give. You can take any rail out for less than you indicate.

MR. DALEY: Oh yes.

MR. BAKER: You indicate between $1.00 and $1.50 as the cost of a weld.

MR. DALEY: Yes.

MR. BAKER: That is with a well organized gang.

MR. DALEY: And the welds not very heavy.

MR. BAKER: And the removal of a rail you indicate costs $50.

MR. DALEY: You would have to take up two rails.

MR. BAKER: If you wanted to renew one rail by welding you could not do it for the figure you gave?

MR. DALEY: It depends on the kind of job and how far you have to travel with your welders.

MR. BAKER: But I would not think it would cost anything like $50 a rail to remove a rail.

MR. DALEY: Roughly you would have to change out two rails. These rails would have to be trucked from the tool house or where replacement rails are kept and the removed rails trucked back. The rails taken out would be considered probably third class or yard track rail. Considering salvage value of rails taken out and all labor involved the expenditure really is considerable.

MR. BAKER: I was under the impression that you estimated cost to reclaim a rail by welding at about $1.00 or $1.50 as against $50 by some other method such as replacement.

MR. DALEY: I wanted to bring out forcibly the advantages of welding.

MR. BAKER: If I understood you, you said that welding of switch points generally is a standard practice on railroads in this country.

MR. DALEY: Yes.

MR. BAKER: I was glad to hear another gentleman bring out the question of whether that should be done on main track high speed switches, and you answered that correctly in my opinion, that you did not recommend it. But there are pretty good railroads in this country that do not weld any switch points.

MR. DALEY: I presume there are.

MR. BAKER: There was some interesting discussion brought out as to the depth of heat treating of rail ends. It was asked how deep did the three torch burner heat the rail. Another question was asked in ordinary spot welding how deep the heat went into the rail. You replied well down to the web.

MR. DALEY: It does in instances.

MR. BAKER: In heat treating what is the result in depth?

MR. DALEY: It gives a heat penetration of about ¼″.

MR. BAKER: It is very shallow, ¼″ or less?

MR. DALEY: Yes.

MR. BAKER: The attempt is made to keep the heat very superficial?

MR. DALEY: Yes.

MR. BAKER: Just one other question. Do you heat treat by contract?

MR. DALEY: No.

MR. BAKER: In the picture you showed no mechanical control, it amounted to that?

MR. DALEY: I understand on your road Mr. Graham has developed a device for heat treating where you have very good control.

MR. BAKER: That is in order to control the depth of the application of the heat, so you know exactly what you are doing.

MR. DALEY: Yes.

PRESIDENT: Mr. Farlow, of the Baltimore & Ohio, may we have a word from you?

MR. G. B. FARLOW: I do not know that I have anything to say. The paper has been very interesting. Some of the Southern railroads have done considerable cropping of rail ends using the acetylene torch. Some railroads do not permit cutting rails with a torch. What has been the result of your experience of that?

MR. DALEY: Maybe Mr. Baker can tell you a lot about that if he wanted to.

MR. FARLOW: You do not want to commit yourself?

MR. DALEY: Yes, some good work has been done. Occasionally they have a failure on account of it.

MR. BAKER: We have found out by actual experience that it should not be done.

MR. DALEY: If you are laying rail close up, a great deal of it is done by torch.

MR. BAKER: We laid a lot of rail by cropping the end with a torch years ago.

MR. DALEY: The Pennsylvania have had at least fifteen years experience with rail cropped with a torch. We have cropped thousands of rails. We do not permit it today.

PRESIDENT: Mr. R. H. Flinn, General Superintendent, Pennsylvania Railroad, may we have a word from you?

MR. R. H. FLINN: Mr. President and Gentlemen: This has been a very interesting and instructive paper. The subject is particularly appropriate at this time when the season's heavy maintenance work is fully under way in the Maintenance of Way Departments of the railroads. We are fond of pointing out the progress that has been made in the past ten years in the application of labor saving devices and improved methods and practices in maintenance and operation, but with all of the progress that has undoubtedly been made there is no place where more remarkable progress has been made in the last few years than in the Maintenance of Way Department, and Mr. Daley's paper tonight has described one of the newer methods which has been profitably applied, and the interest in the subject has been displayed from the discussion which we have had. I move you, Mr. President, that we express our appreciation of Mr. Daley's paper by a rising vote of thanks.

The motion was duly seconded and carried by unanimous vote.

There being no further business the meeting was adjourned to the luncheon tables for a social hour.

J. D. CONWAY, Secretary.

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. SEPTEMBER 27, 1934. No. 8.

WHAT OF THE RAILROAD FUTURE

By MR. JOHN J. CORNWELL, General Counsel,

The Baltimore and Ohio Railroad Company, Baltimore, Md.

OFFICIAL PROCEEDINGS
OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII No. 8. | Pittsburgh, Pa., Sept. 27, 1934 | $1.00 Per Year 25c Per Copy

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*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
SEPTEMBER 27th, 1934

The meeting was called to order at the Fort Pitt Hotel at 8:00 o'clock, P. M., with President C .O. Dambach in the chair.

Registered attendance, 244, as follows:

MEMBERS

Allen, Harvey
Arnold, J. J.
Babcock, F. H.
Barnhart, B. F.
Barr, H. C.
Beam, E. J.
Berg, Karl
Bone, H. L.
Bradley, W. C.
Britt, T. E.
Buffington, W. P.
Burel, W. C.
Burnette, G. H.
Campbell, Edward D.
Cannon, T. E.
Carlson, L. E.
Carr, T. W.
Carruthers, G. R.
Carson, John
Caffin, H. B.
Christy, F. X.
Clark, C. C.
Code, J. G.
Conway, J. D.
Cook, S. J.
Crawford, A. B.
Crenner, J. A.
Crow, C. C.
Cruikshank, J. C.
Dambach, C. O.
Davis, Charles S.
Durkin, James E.
Derr, A. I.
Emery, E.
Endsley, Louis E., Prof.
Falkner, A. J.
Finnegan, Leo
Fitz Simmons, E. S.
Flinn, R. H.
Forsberg, R. P.
Frauenheim, P. H.
Freshwater, F. H.
Fults, J. H.
Gardner, George R.
Gatfield, Phillip
Gellatly, William R.
Gilg, Henry F.
Gillespie, J. Porter
Glaser, J. P.
Glenn, J. H.
Goda, P. H.
Grieve, Robert E.
Haller, Nelson M.
Hansen, William C.
Harper, G. C.
Herbert, T. C.
Herrold, A. E.
Hilstrom, A. V.
Holmes, E. H.
Hoover, J. W.
Huff, A. B.
Hughes, I. Lamont
Irwin, R. D.
Keller, R. E.
Kentlein, John
Kirk, W. B.
Klassen, F. G.
Kramer, F. E.
Kramer, W. E.
Kraus, Raymond E.
Kruse, J. F. W.
Kulp, J. G.
Lawler, Joseph A.
Lanahan, Frank J.
Lee, L. A.
Leet, C. S.
Leiper, C. I.
Longdon, Clyde V.
Maliphant, C. W.
Mayer, L. I.

Megee, C. R.
Miller, John
Misklow, C. J.
Misner, George W.
Mitchell, W. S.
Montague, C. F.
Moore, Donald O.
Morgan, A. L.
Morgan, Homer C.
Moyer, Oscar G. A.
Murray, Stewart
McHugh, C. A.
McKay, N. H.
McKinley, A. J.
McKinley, John T.
McMillan, A. P.
McMullen, Clark E.
Nagel, James
Nash, R. L.
Norris, J. L.
O'Connor, M. J.
O'Leary, J. J.
Orbin, G. N.
O'Sullivan, J. J.
Page, A., Jr.
Paisley, F. R.
Passmore, H. E.
Posteraro, S. F.
Purchard, Paul
Rankin, B. B.
Redding, P. E.
Rizzo, C. M.
Rutter, H. E.
Ryan, D. W.
Rys, C. F. W.
Schaffer, W. E.
Seiss, W. C.
Sekera, C. J.
Severn, A. B.
Sheridan, T. F.
Simons, Philip
Slick, F. F.
Snitehurst, J. G.
Snyder, F. I.
Stevens, L. V.
Stewart, L. R.
Stucki, A.
Sullivan, A. W.
Sutherland, L.
Thomas, T.
Tipton, G. M.
Tomasic, N. M., Jr.
Triem, W. R.
Tucker, John L.
Unger, Dr. J. S.
Van Blarcom, W. C.
Weaver, W. Frank
Webster, H. D.
West, Troy
Wikander, O. R.
Woods, G. M.
Woodward, R.
Wright, Edward W.
Wynne, E. E.
Yarnall, Jesse

VISITORS

Alexy, G. H.
Balph, M. Z.
Beeb, Joseph W.
Beltz, J. D.
Bennett, H. G. R.
Bollman, W. F.
Booth, W. F.
Boston, J. R.
Bright, W. J.
Callahan, P. A.
Carey, William F.
Carver, Alex B.
Catt, C. E.
Chidester, H.
Christy, G. J.
Clarke, A. C.
Colligan, P.
Colmery, M. S.
Corbett, Joseph L.
Cornwell, J. J., Hon.
Cortez, Frank
Cotton, C. S.
Devaughn, J. P.
Dierker, R. H.
Doggett, A. L.
Donaldson, James
Duff, S. B.
Dugan, William J.
Eines, J. A.
Farlow, G. B.

Felter, F.
Follett, W. F.
Forster, C.
Fowler, F. H.
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Fulwider, R. E.
Gallagher, W. P.
Gray, Robert A.
Greek, Joseph
Trewin, A. P.
Hewes, John, Jr.
Hodges, A. H.
Hofmann, E. L.
Holtzworth, C. H.
Hopper, George
Jenny, A. S.
Keane, F. M.
Keck, L. M.
Keys, A. H.
Kohl, Howard M.
Kohn, John C.
Kuhnert, P. C.
Larson, W. E.
Layman, F. A.
Lear, Edward J.
Lewis, S. B.
Lindsay, S. A.
Lloyd, John
Lowe, William T.
Macinlis, Jonas
Marx, Ernest
Miller, J. Paul
Mollman, M. L.
Moore, M. K.
Moser, Ralph
Mowery, George B.
Murphy, C. E. Ted
McOsker, C.
Neale, Jack
Peck, E. A.
Peck, W. A.
Peters, W. B.
Quinn, John J.
Randall, Walter M.
Ray, W. M.
Reynolds, D. E.
Riddle, F. L.
Robinson, H. N.
Rupp, Edwin
Sherron, John
Shuster, W. W.
Smith, A. W.
Smith, Robert B.
Smith, Sion B.
Snitehurst, J. H.
Steacey, A. B.
Stevenson, L. N.
Stewart, Ralph D.
Terkelsen, Bernard
Terrent, H. J.
Van Zandt, L.
Wampler, J. S.
Warad, R. H.
Webster, G. B.
Wickerham, F. A.
Williams, R. R.
Wossel, P.
Wimfierther, William J.
Yohe, J. K., Jr.

Previous to the formal session a delightful musical program was presented by Mr. Ralph Maser, baritone, and Mr.Jack Neale, pianist, both employees of the Baltimore and Ohio Railroad, following which, on motion of Past President F. I. Snyder, a rising vote of thanks was extended to the gentlemen as an expression of appreciation for their splendid program.

The business meeting being called to order, the call of the roll was dispensed with, as the registration cards furnish a complete record of attendance.

By common consent the reading of the minutes of the last meeting was dispensed with as the printed Proceedings have been in the hands of the members for some time.

The Secretary read the following list of proposals for membership:

Balph, M. Z., Assistant Engineer, P. & L. E. R. R., 3308 Sixth Avenue, Beaver Falls, Pa. Recommended by F. J. Nannah.

Beaver, J. D., General Superintendent, P. S. & N. R. R., St. Marys, Pa. Recommended by C. O. Dambach.

Beltz, J. D., Superintendent, B. & O. R. R., 2915 Belrose Avenue, South Hills, Pittsburgh, Pa. Recommended by C. O. Dambach.

Bishop, M. L., A. R. A. Clerk, P. & W. Va. Ry. Co., 126 Sanford Street, 20th Ward, Pittsburgh, Pa. Recommended by J. H. Glenn.

Carroll, Edward John, Train Dispatcher, P. & W. Va., Ry. Co., 307 Fifth Avenue, Carnegie, Pa. Recommended by J. H. Glenn.

Catt, C. E., Assistant Division Accountant, B. & O. R. R., B. & O. Passenger Station, Pittsburgh, Pa. Recommended by C. O. Dambach.

Cavanaugh, T. J., Chief Special Agent, P. & W. Va. Ry. Co., 100 Beltzhoover Avenue, Pittsburgh, Pa. Recommended by J. H. Glenn.

Dempsey, Alex., Clerk to M. C. B., P. & W. Va. Ry. Co., 1104 Bidwell Street, N. S., Pittsburgh, Pa. Recommended by J H. Glenn.

Doggett, A. L., Freight Traffic Manager, B. & O. R. R., Oliver Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Friend, Edward F., Asst. Chief Clerk, Traffic Department, Pittsburgh Coal Company, Oliver Building, Pittsburgh, Pa. Recommended by George R. Gardner.

Greek, Joseph, Section Foreman, P. & W. Va. Ry. Co., 812 Logan Street, Carnegie, Pa. Recommended by J. H. Glenn.

Hewes, John, Jr., Transportation Assistant, B. & O. R. R., B. & O. Passenger Station, Pittsburgh, Pa. Recommended by C. O. Dambach.

Kramer, F. E., Steam and Electrical Engineer, P. & W Va. Ry. Co., 3285 Waltham Avenue, Dormont, Pittsburgh, Pa. Recommended by J. H. Glenn.

Lloyd, John, Assistant General Superintendent, Edgar Thomson Works, Carnegie Steel Company, Braddock, Pa. Recommended by F. F. Slick.

May, Herbert A., Vice-President, Safety Car Heating & Lighting Company, 3605 Gulf Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

Robertson, A. S., Traffic Manager, Montour Railroad, 8 Market Street, Pittsburgh, Pa. Recommended by George R. Gardner.

Shuster, William W., Roadmaster, P. & W. Va. Ry. Co., Pittsburgh, Pa. Recommended by C. O. Dambach.

Tryon, I. D., Freight Agent, P. & W. Va. Ry., Fourth & Liberty, Pittsburgh, Pa. Recommended by C. O. Dambach.

PRESIDENT: These proposals will be submitted to the Executive Committee, in accordance with our By-Laws, and upon approval by that Committee the gentlemen will become members without further action of the Club.

Are there any communications to be presented?

SECRETARY: There are several telegrams and letters which I think should be read.

C. O. DAMBACH, Genl. Mgr.,
Pittsburgh & West Va. Rwy. Co., Pgh.

Since writing you September eleventh I find that it is necessary to attend important meeting of Co-ordinating Committee in New York which I very much regret prevents my attending your meeting tomorrow depriving me of the honor of introducing Governor Cornwell who is to address you.

C. W. GALLOWAY.

C. O. DAMBACH, President,
Railway Club of Pittsburgh, Pittsburgh, Pa.

Sorry am unable to attend your dinner today. Best wishes.

H. H. TEMPLE.

Also our Committee has had considerable correspondence in reference to a resolution which the Western Pennnsylvania Safety Council desires to be presented to this meeting for action. The resolution is as follows:

RESOLUTION

WHEREAS, the revival of business and industrial activities, the return of hundreds of thousands of school children to their classrooms and the more general use of private automobiles and commercial trucks can be expected to provide greater and more numerous hazards in the plants, on the streets and highways, and in the schools and homes, and

WHEREAS, the Western Pennsylvania Safety Council, with the co-operation of the State of Pennsylvania, the City of Pittsburgh, the various counties and cities in the Western part of the Commonwealth, is conducting a three months' safety campaign during September, October and November, to be known as "Everybody's Safety Drive," and

WHEREAS, it is to the interest of each and every resident of Western Pennsylvania to support this movement in an effort to reduce accidents and fatalities of any and all sorts,

NOW THEREFORE WE, The Railway Club of Pittsburgh, do hereby solemnly resolve in meeting assembled to lend our every support to the Western Pennsylvania Safety Council and its component parts to the end that our community will be a safer and happier place in which to live.

(Signed) C. O. DAMBACH, President.

ON MOTION of Past President Frank J. Lanahan the resolution is adopted and the privilege of the floor is extended to the Western Pennsylvania Safety Council for a period of ten minutes at our next meeting, which will be the Annual Meeting of the Club.

SECRETARY: Since our last meeting we have received information of the death of quite a number of our members, including two Past Presidents. Their names are as follows:

E. S. Harger, General Foreman, P. & L. E. R. R., died April 21, 1934.

Frank H. Stark, Past President, 1905-1907, died June 30, 1934.

T. A. Milby, Investigator for State Auditor, died July 13, 1934.

John E. Hughes, Past President, 1931-1932, died August 20, 1934.

Harry E. Sheets, Traffic Manager, Montour R. R., died July 27, 1934.

Robert B. Keenoy, Retired Vice-President, Donora Southern R. R., died August 23, 1934.

S. L. Church, Engineer Maintenance of Way, P. R. R., died September 11, 1934.

MR. J. G. CODE: There should be added to that list the name of another Past President, Mr. A. G. Mitchell, word of whose death came recently.

SECRETARY: Mr. Mitchell was President of the Club in 1912-1914. He resigned his membership in the Club quite some time ago on account of retiring and moving away from this part of the country. However it is fitting that mention of his passing should be made at this time.

PRESIDENT: All of these deceased members were well and favorably known to most of us. Their passing is a distinct loss to our Club. An appropriate memorial minute will appear in the next issue of the Proceedings.

It has been customary for the Chair to appoint at this meeting a Committee to suggest nominations for officers for the coming year. Following that custom, I will appoint as a Nominating Committee Professor Louis E. Endsley, Mr. E. Emery and Mr. F. I. Snyder, and I will ask the Committee to retire and bring in a report before the close of the meeting.

If there is no other business to be brought before the Club at this time, we are up to the address of the evening. This Club has listened during the past few years to many interesting discussions in connection with nearly every department of the railroads and their facilities, with the single exception of the legal department. We are very fortunate tonight in having with us a man foremost in this profession, who has been associated with one of our great trunk lines for about thirty years, a former Governor of our sister state, West Virginia, and very well qualified to speak on the subject which is of vital interest to all of us. It affords me a great deal of pleasure to present to you Mr. John J. Cornwell, General Counsel, Baltimore & Ohio Railroad, who will speak to you on "What of the Railroad Future."

WHAT OF THE RAILROAD FUTURE

By MR. JOHN J. CORNWELL, General Counsel, The Baltimore and Ohio Railroad Company, Baltimore, Md.

Transportation is the basis of our whole economic and industrial structures. It is an essential element in our civilization. The production of articles of trade and commerce would be useless could those articles, when produced, not be transported to the places and the peoples where they may be used or consumed.

Trade and commerce have developed and expanded only as transportation facilities have grown, increased and improved, and every civilization the world has ever known has been founded upon trade and commerce. Any nation whose trade and business lapse and perish is destined likewise to see its culture and civilization die.

The trade and commerce of countries of the Old World were founded in large part upon water transportation, but the economic and industrial development of this country, with its vast inland areas, was built upon our railroads. The country grew in population and developed industrially as railroads were constructed during the nineteenth century.

Despite new forms of transportation by air, by land and by water, the time has not come, if, indeed, it ever does, when our trade and commerce; when our country and our civilization can dispense with the railroads. More than one hundred thousand freight cars still are loaded daily and the freight delivered at its destination, despite all other forms of transportation and despite the fact the general business level is at little more than fifty per cent of what, a few years ago, we regarded as normal. It is plain, therefore, that the railroad transportation industry with which you and I are identified is still an important, yes, a necessary, thing in our industrial economic and social life.

Then, there are other phases of the industry that are important, aside from its value and necessity as a transportation agency. One is the tremendous investment in it of the people's savings—almost twenty-five billions of dollars. It is the largest, measured by money, of any, except the investment in agriculture. Despite all that has been said on the subject still there are statements made by politicians and propagandists which lead many people to believe that the railroads are owned by a few big bankers and bloated bondholders, whereas millions of people are direct, and almost all of the people in this country are indirect, owners.

Take the two principal railroads here in Pittsburgh: Almost fifty thousand people own the stock of the Baltimore and Ohio, with an average holding of less than one hundred shares each, while there are almost a quarter of a million owners of the Pennsylvania.

Of the eleven billions of dollars of railroad bonds outstanding more than one-half is owned by savings banks and insurance companies in which more than ninety per cent of the American people have a direct interest. It is easy to see, therefore, that from the financial standpoint the general public has a very real financial interest in the railroads and in their future.

Then, more than a million persons still are employed by the railroads at an average wage higher than prevails generally in industry.

Finally, the railroads are large consumers of coal, of steel, of lumber and of other commodities. With the railroads out of the market for such commodities those industries must continue to lag.

With these facts before us may we not say truthfully that the future of the railroads is of vital importance not only to those who own, operate and work with them but to all the people?

It is not necessary for me to tell the members of this Club what the present railroad situation is. You know only too well that there is more railroad mileage in receivership than ever before at any one time; that many roads not in receivership are not earning their interest and taxes or are barely doing so by curtailing expenditures of all kinds to the very limit.

You know, too, that, despite their cramped financial condition, they have been rendering and are continuing to render highly efficient service. But you also know, you railroad men, what many people do not appreciate, that if this starvation of the railroads continues very much longer their service is bound to be impaired.

Of course I need not undertake to tell you what it is that has brought this period of starvation to the railroads. You well know that their present financial plight is due to two causes—the depression and to unregulated and government-subsidized competition.

Before discussing the question of competition I do want to say, however, that occasionally we hear criticism from important quarters of railway managements for having over-expanded their facilities; for having made large and unnecessary expenditures for additional tracks, terminals, stations and equipment they do not now need.

It is your duty and mine to answer those criticisms by pointing to the facts.

Those facts are found in the conditions just before, during and just after the World War. Prior to the War the country's growth had outstripped the railroads. There was a constant shortage of rail transportation because the Government's agent, the Interstate Commerce Commission, did not allow rate increases which would permit the railroads to earn a fair return on the value of their property, making it impossible for managements to obtain the capital necessary to bring rail development abreast of the country and the industrial growth thereof.

The War, governent-operation of the roads during the War period and the lack of necessary transportation, impressed upon the public and upon governmental authorities the importance, the necessity, of a more liberal policy toward the railroads, so the Transportation Act of 1920 contained a mandate to the Interstate Commerce Commission to allow and to establish rates that would enable the roads to earn a fair return. This was done to enable them to obtain money to expand their facilities to meet the demands of the public and the needs of industry.

In the year of 1923 alone one billion one hundred millions of dollars were obtained by borrowing, by the sale of bonds and equipment-trust certificates, for the public would not buy railroad stock, and the expansion of railroad facilities began in earnest. Time and again the railroads were warned by shippers, politicians and others that if they did not put themselves in a position to handle efficiently the public's business the Government would be forced to take over and operate them, notwithstanding the public had found government-operation most unsatisfactory during the War.

The year of 1923 was the first of a seven-year period of great industrial activity. All the railroad facilities were needed, were used, and even if rail managements had been gifted with foresight no one else possessed and had seen this depression period coming, they would not have been allowed to hedge and cease developing their properties.

The result was that more than six billions of dollars of additional money was secured from the public and used for the development of the railroad plant, taken as a whole, from 1922 to the end of 1929, when the slump began—invested because the public demanded improved and expanded railroad facilities.

This depression has been a stern teacher not only for railroad managements but also for managements of all industries. Necessity is a hard master. Railroad managements have had to economize in every possible way and many of the economies have come to stay, for science has been brought into play in many instances, such as the treatment of water used in engines and the obtaining of greater results from each pound of coal consumed. In consequence, the moderate upturn in business last year and the first part of the present year encouraged railroad managers and owners to feel that there were brighter days ahead for the carriers. All of us hope that the recent recession is a temporary one and that railroad revenues will again speedily show a substantial increase. If their earnings were sufficient to allow them to enter the markets for rails and new equipment it would prove a great impetus to general business.

But the depression, drastic as it has been, was not the only thing with which the railroads have had to contend.

For many years our Government has been investing huge sums of tax-money in waterway development. That, in the beginning, appeared to be a sound public policy, for at that time and, indeed, up until half a dozen years ago, there was no surplus of transportation facilities. However, now we have a very great surplus. The policy of our Federal Government today is to get rid of surpluses of all kinds by controlling production. If that is a sound policy as to agriculture and manufactured products why is it not sound as to transportation? Why should we go on pouring millions into our rivers in the mere hope or expectation they will be used? Why should the Government itself continue to operate river barge lines in competition with the railroads?

And, finally, why should this form of transportation, competing with the railroads, go unregulated? Why should not the same laws, rules and regulations as to rates and practices be applied to water carriers as are applicable to the railroads? Is not the present system gross discrimination against the railroads, whose tax-money, in part, is invested by the Government in the waterways?

In addition to all this, the waterways are free. Why should they be? Just now with mounting taxes and growing deficits in the public treasury, why should not the water highway users pay tolls to maintain those highways and pay interest on the money the people have invested in them?

In the past score of years the public has invested in modern highways throughout the country money in amount practically equal to their total investment in the railroads. These highways were the result of the development of motor vehicles. I do not think it was contemplated that the highways ever should be monopolized by heavy commercial vehicles, operated in interstate commerce, yet highway commerce by truck has grown at a tremendous rate, especially during the past half dozen years, and the heavy truck is today a real railroad competitor.

The railroad managements have no right to complain of competition when it is on an equal footing with them. If the railroads can not meet that kind of competition then they must pass out—give way to other forms of transportation; but taxed heavily, regulated rigidly, how can they compete with other forms of transportation untaxed and unregulated; transportation that is directly or indirectly subsidized by the Government?

I say subsidized directly because while ship lines and air lines are voted mail subsidies the Post Office Department, in its laudable effort to avoid deficits, is putting into practice rules that are reducing revenues derived by the railroads from carrying the mails.

The application recently made to the Interstate Commerce Commission for an increase in freight rates has been a subject of criticism by some shippers and newspapers. It is no secret that the application was made most reluctantly. Undoubtedly there is a question whether or not some more freight may be diverted from the rails if the increase is granted, but what else could the railroads do?

The increase in cost of operation of the Class I railroads per annum, due to the wage restoration and the increase in cost of fuel and supplies under the N. R. A. Codes, amounts roundly to three hundred millions of dollars. Without a rate increase or a tremendous and sustained increase in the volume of business, with these added charges not a dozen railroads in the United States could earn interest and taxes, after the payment of operating costs.

The railroads made no complaint when the price of coal was advanced under the N. R. A. Code. In the case of the Baltimore and Ohio the increased price of fuel meant an additional outlay of four millions of dollars a year. Other commodities purchased by the railroads advanced in price also.

Must the railroads absorb all this increase? Must all the benefit go to the producer?

That would not be fair were the carriers in a position to do it, which they are not. Their very existence is at stake. The proposed increase is vital to them if they are to continue to function as efficient transportation agencies and those shippers who oppose a rate increase would be the first to complain should rail service become inefficient.

The present railroad picture, therefore, is not a very pleasant one.

When we come to consider the *future* of the railroads one is bound to enter the field of speculation. The word "if" becomes a most important one. However, it is reasonable to believe that the responsible heads of our Government, and the general public as well, appreciate the railroad situation and are anxious to relieve it. They can not afford to permit it to continue.

Thus far nothing has been done in the way of legislation to enlarge railroad earnings, but increased prices and payments into the retirement fund, results of Congressional legislation, have added to railroad expenditures more than one hundred and fifty millions of dollars. It is but natural and reasonable to suppose that Congress will, now that it has imposed these burdens, take steps which will enable the railroads to carry them.

Recently Professor Moley, a close friend of President Roosevelt, writing in his magazine about the railroad situation, of which he had a profound appreciation, said: "The Administration has a railroad policy." That statement accepted, one naturally inquires, "What is that 'policy'?"

In a speech at Salt Lake City in the campaign of 1932 President Roosevelt outlined his policy, or at least what he had in mind, at that time. Briefly, it was:

- to make loans to solvent railroads for a reasonable period—perhaps while efforts for national recovery were in progress;
- to amend the bankruptcy law so financially embarrassed companies might more speedily and economically readjust their capital structures; and,
- finally, to bring other forms of transportation under the control of the Interstate Commerce Commission.

The bankruptcy law was amended by Congress. The Reconstruction Finance Corporation has made loans to the railroads aggregating some three hundred millions of dollars. That is a large sum of money, but it is well secured by collateral. It is less than one-third the amount the Governmenet lent to the carriers after they were returned to their owners by the Government, following the World War, practically all of which was repaid and on which the Government received a handsome profit in the way of interest.

However, no legislation has been enacted to regulate other forms of transportation. Instead there was passed the Emergency Railway Act, creating the position of Coordinator of Transportation.

The labor provisions of that Act made it impossible to effect any immediate, substantial economies through the coordination of railroad facilities, but the Coordinator has conducted a comprehensive and exhaustive investigation not only of the general railroad situation but of many specific conditions as well. Already he has made several reports and doubtless the most comprehensive of all will be submitted prior to the next session of Congress. He, too, strongly recommended the bringing of other forms of transportation under government-regulation.

In view of the President's program, as outlined in his Salt Lake City speech and in view of the Coordinator's recommendation, is it not reasonable to believe that legislation putting the railroads on a parity with other forms of transportation will be enacted speedily?

Is it not reasonable to believe, also, in view of the President's approval of the principle and the Government's financial needs, that users of inland waterways, improved with public money, will be required to pay tolls, if not commensurate with the facilities afforded, at least sufficient to maintain them and to pay the interest on the public's money invested in them?

This legislation would appear to be reasonably certain of enactment.

If it is enacted and if the gigantic efforts being made to stimulate business are in a reasonable measure successful, then the future of railroads looks much brighter than does their present picture.

I am not an economist, not a professor and certainly not a prophet, but I do have faith. I have faith not only in what is being attempted by our Government but I have faith in our country and in its people.

For one, I do not believe this country has reached the end of its road of progress. When readjustments have been made to meet the changed conditions it will do as it has done after every other depression—resume its onward march.

I am not unmindful of the difficulties, even the dangers, that still lie ahead of us, but I am certain they will be met and conquered, as always they have been. The railroads are now adjusting and will continue to adjust themselves to changed conditions if they remain under private management and are given a freer hand. There is no charge less true than that railroad managements have not been progressive; that they have not kept up with the times. Up until 1924 or 1925 they were engaged in a desperate struggle to handle the rapidly growing business of the country. The railroad lines, or many of them, had to be rebuilt, some of them two or three times. There was always the problem of procuring the necessary capital, for rates, earnings and profits, on the average, were so low it was difficult to induce the public to invest in their securities. But all the while rail transportation became more efficient; travel on railroad trains became safer than staying in one's home, and at the same time operating costs were coming down. Certainly that was an achievement, especially when all the circumstances and handicaps are considered.

Finally, it is inconceivable that the American people and the American Government will continue a policy that will destroy their chief method and instrument of transportation, especially for transporting the bulky and heavy commodities. There is every reason to believe, as I have indicated, the coming Congress will act.

Of course, favorable legislation of the character I have mentioned could be nullified if the Government pursued an extravagant and uneconomic policy of further development of inland waterways, creating a still greater surplus of transportation facilities at public expense, such as the proposed Beaver and Mahoning Canal, which is enthusiastically advocated by some of your Pittsburgh people.

Pittsburgh's development has been due not so much to its water as to its rail transportation and the railroads have been the best and biggest customers of the steel mills upon which this community so largely depends. If you persuade the Government to give you a free canal to Lake Erie to get cheaper iron ore at Pittsburgh you will find you will need far less iron ore, for as you deplete the purchasing power of the railroads you reduce the business of your steel mills and cause more and more unemployment. That is Pittsburgh's chief trouble today.

PRESIDENT: I believe we all know a lot more not only about the future but the past and present of the railroads. The Governor has given us a lot of things to think about, and no doubt some of our members will have questions that they would like to ask the speaker, and I know he will be glad to answer any questions as far as he may be able. To open the discussion, I see Mr. Hughes in the front row and I will call on him.

MR. I. LAMONT HUGHES, President, Carnegie Steel Company: I do not know that I have anything to say here tonight further than to agree with the speaker. I am glad to have been here to listen to such a wonderful exposition of the railroad situation and to offer my sympathy, because with the railroads in trouble they do not give us any orders. I thank you for calling on me.

PRESIDENT: Right behind Mr. Hughes I see Mr. Lanahan. We would like to hear from him.

MR. FRANK J. LANAHAN: I am in somewhat of a daze. The optimism so fluently expressed by Governor Cornwell that things will work out satisfactorily, ingenders the wish that he be right in his opinion. The encouragement that the Governor so freely extends is a vertible tonic, but the skepticism concerning the feasibility of many of the phases of the New Deal, injects the fear, that before the patient may have the opportunity of recovering, the operation will be fatal.

We are confronted by an unprecedented situation, and irrational radicalism cannot be tolerated under any circumstances. We must be guarded against social disruption and economic chaos by constructive intelligence. Far from solving the ills from which we suffer, is the alleviating of the troubles of one branch of industry at the expense of another.

While we all here tonight sympathize with the railroads in their problem, the question arises—predicated on previous experience—if at the present, an increased freight rate is granted, is it not feasible to deduct that there will follow legislation where this increase of revenue will be passed on for operating charges? It is encumbent upon those concerns who have reached the edge of bankruptcy or receiverships, to inquire how can they possibly shoulder this additional imposition upon their output. The most casual investigation will disclose the pathetic situation of a large number of industrial concerns.

Where poverty among their depleted ranks of employees is rampant, with resources exhausted, their prospects closely approach the hopeless. These poor people are saddened in heart, dejected in mind and palsied in hand by their perplexities. They see how fruitless it is to endeavor alone and unaided, to stem the current that is now sweeping them to destruction. They can but hope that God will bring the relief that no man has been able to give.

PRESIDENT: Mr. Doggett, Freight Traffic Manager, B. & O. R. R.: We would like a word from you.

MR. A. L. DOGGETT: Mr. President and Gentlemen: I came as a visitor to the Railway Club of Pittsburgh and I find myself elected a member. That indicates to me at least that I am made very welcome. It is really a pleasure to be with you this evening and I want to take this occasion to pay a well deserved tribute to Governor Cornwell for his sterling qualities. I thank you, Mr. Chairman.

PRESIDENT: Mr. Leiper, have you anything to add to the discussion?

MR. C. I. LEIPER, General Manager, Pennsylvania Railroad: Mr. President, each time I listen to Governor Cornwell I am impressed with the wisdom and enterprise of President Willard and his associates in seeking, and their good fortune in securing, Governor Cornwell as one of their executives. His clarity of thought and expression are splendid, and I think we are very fortunate in his having been willing to come here tonight and express so splendidly the situation that he has described and I am very glad to have been here.

PRESIDENT: We have with us tonight Mr. Moore, of the Chamber of Commerce. We would like to hear from him.

MR. D. O. MOORE: I do not feel as though I can present anything of interest to this group, which includes so many executives, but I have one thought as to the situation. I believe that the people who have had the courage, initiative and the faith to engage in enterprises and put their money in them, which provides employment for millions of men, should be entitled to some encouragement by our Government as well as those on the other side of the fence. I have always worked for somebody else, with the exception of about three years, when I was in partnership with another man, and I know we had difficulty sometimes in meeting our small pay roll whether we had anything left for ourselves or not. I hope our Government will soon accord the railroads some encouragement in the solution of this problem.

PRESIDENT: Professor Endsley, may we hear from you?

PROF. L. E. ENDSLEY: I do not believe I have anything to add but I do want to say that I have enjoyed very much the talk of the Governor tonight.

PRESIDENT: Mr. Flinn, have you any comment to make?

MR. R. H. FLINN: Mr. President and Gentlemen: There isn't anything that I could add to the discussion. Personally I have enjoyed it very much. Those who have spoken before me have also said the same thing, so I think it is only necessary for me to say that the attentive audience here tonight has been ample evidence of the fact that we have listened to a very interesting and instructive address. I just want for the sake of making a record of it to move that the Railway Club formally express its appreciation by a rising vote of thanks for this most excellent address.

The motion was duly seconded and prevailed by unanimous rising vote.

GOVERNOR CORNWELL: Mr. President, may I say that I am deeply grateful for this very generous expression from you. I want to tell you that I am simply a railroad man, as most of you are, and it is a great pleasure for me to come here tonight and meet with you railroad men in Pittsburgh. The pleasure has been all mine and that is purely a generous gesture on your part. I thank you.

PRESIDENT: I see our Nominating Committee has returned. May we have their report:

CHAIRMAN L. E. ENDSLEY: Our report is ready. I will ask the Secretary to read it.

REPORT OF NOMINATING COMMITTEE:

FOR PRESIDENT—R. H. Flinn, General Superintendent, Pennsylvania Railroad, Pittsburgh, Pa.

FOR FIRST VICE-PRESIDENT—C. M. Yohe, Vice-President, P. & L. E. R. R., Pittsburgh, Pa.

FOR SECOND VICE-PRESIDENT—E. A. Rauschart, Mechanical Superintendent, Montour Railroad, Coraopolis, Pa.

FOR SECRETARY—J. D. Conway.

FOR TREASURER—E. J. Searles, Manager, Schaefer Equipment Company, Pittsburgh, Pa.

EXECUTIVE COMMITTEE (Ten to Elect)—Frank J. Lanahan, Chairman; A. Stucki, Samuel Lynn, D. F. Crawford, G. W. Wildin, W. S. McAbee, E. W. Smith, Louis E. Endsley, F. I. Snyder, C. O. Dambach.

SUBJECT COMMITTEE (One to Elect), 3 Years—R. P. Forsberg, Chairman, Chief Engineer, P. & L. E. R. R., Pittsburgh, Pa.

RECEPTION COMMITTE (Two to Elect), 3 Years—J. A. Warfel, Special Representative, Air Reduction Sales Company, Pittsburgh; 3 Years, W. C. Burel, Master Mechanic, Western Allegheny Railroad, Kaylor, Pa.

ENTERTAINMENT COMMITTEE: (Two to Elect) 3 Years —E. H. Holmes, Sales Department, Fort Pitt Malleable Iron Company, Pittsburgh, Pa.

3 Years—C. C. Clarke, Sales Manager, Central District, Pressed Steel Car Company, Pittsburgh, Pa.

FINANCE COMMITTEE—(One to Elec)—3 Years—G. W. Honsberger, Salesman, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

MEMBERSHIP COMMITTEE—(Five to Elect) 3 Years—T. E. Britt, Division Storekeeper, B. & O. R. R., Pittsburgh, Pa.

3 Years—R. S. Bull, Superintendent Power & Inclines, Pittsburgh Railways Company, Pittsburgh, Pa.

3 Years—A. F. Coulter, Master Car Builder, Union Railroad Company, East Pittsburgh, Pa.

3 Years—T. R. Dickinson, Purchasing Agent, B. & L. E. R. R., Pittsburgh, Pa.

3 Years—D. K. Orr, Roadmaster, Monongahela Railway Company, Brownsville, Pa.

Louis E. Endsley, Chairman
E. Emery,
F. I. Snyder.

PRESIDENT: Are there any other nominations? It is in order to make any further nominations you wish. If there are no further nominations, in accordance with our By-Laws the nominations will be submitted to letter ballot and the result will be reported to the next meeting, which will be the Annual Meeting.

If there is no further business, the meeting will stand adjourned.

J. D. CONWAY, Secretary.

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

$1.00 Per Year 25¢ Per Copy

Vol. XXXIII. OCTOBER 25, 1934. No. 9.

ANNUAL MEETING—ELECTION OF OFFICERS
LIST OF MEMBERS

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

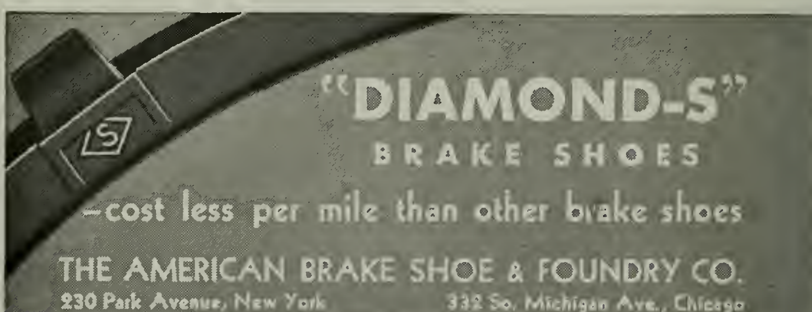
Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa.

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIII
No. 9.

Pittsburgh, Pa., Oct. 25, 1934

$1.00 Per Year
25c Per Copy



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Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
OCTOBER 25th, 1934

The ANNUAL MEETING of the Railway Club of Pittsburgh was called to order at the Fort Pitt Hotel at 8 o'clock, P. M. with President C. O. Dambach in the chair.

Attendance as shown by registration cards, 426 persons, 30 of which neglected to sign cards at the door.

MEMBERS

Adams, W. A.
Ambrose, W. F.
Ament, F. Chalmer
Aulbach, Albert J.
Babcock, F. H.
Baer, Harry L.
Baker, George N.
Barr, H. C.
Batchelar, E. C.
Beam, E. J.
Berg, K.
Best, D. A.
Blest, M. C.
Braun, O. F.
Bricker, O. F.
Britt, T. E.
Bruce, S. S.
Burel, W. C.
Burnette, George
Callahan, F. J.
Carlson, L. E.
Carr, T. W.
Carson, John
Cavanaugh, T. J.
Chaffin, H. B.
Cipro, Thomas
Clark, C. C.
Code, J. G.
Conway, J. D.
Cotter, G. L.
Courtney, H.
Covert, G. W.
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Crawford, D. F.
Cruikshank, J. C.
Cunningham, R. I.
Dalzell, W. E.
Dambach, C. O.
Davies, James
Davis, Charles S.
Davis, John M.
Dehne, G. C.
Dempsey, A.
Dickinson, T. R.
Eisenman, W. H.
Emery, E.
Fenton, H. H.
Ferguson, J. H.
Ferguson, R. G.
Fisher, John J.
Fitz Simmons, E. S.
Fleckenstein, August
Flinn, R. H.
Foard, E. A.
Forsberg, R. P.
Frauenheim, A. M.
Friend, Edward F.
Fry, L. H.
Fults, J. H.
Furch, George J.
Gaffney, Thomas H.
Gardiner, J. E.
Gardner, George R.
Germak, George A.
Gilg, Henry F.
Gillespie, J. P.
Glaser, J. P.
Goda, P. H.
Haller, Nelson M.
Hancock, Milton L.
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Harper, J. T.
Hayward, Carlton
Hellriegel, W. H.
Herbert, T. C.
Herrold, A. E.

Hilstrom, A. V.
Holmes, E. H.
Honsberger, G. W.
Hoover, J. W.
Huff, A. B.
Hykes, W. H.
Irwin, R. D.
Jones, William M.
Kapp, A. C.
Kavanagh, D.
Keller, R. E.
Kirk, W. B.
Klassen, H. G.
Kramer, W. E.
Kraus, Raymond E.
Krause, Harry A.
Kruse, J. F. W.
Lanahan, J. S.
Lee, L. A.
Lincoln, J. J., Jr.
Long, R. M.
Longdon, Clyde V.
Lowry, William F., Jr.
Lynn, Samuel
Maliphant, C. W.
Masterman, T. W.
Meinert, Henry
Millar, C. W.
Mills, C. C.
Misklow, C. J.
Misner, George W.
Mitchell, W. S.
Moir, W. B.
Montague, C. F.
Montgomery, J. L.
Moore, D. O.
Moyer, O. G.
Murray, Stewart
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McKinzie, Edward
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Sample, W. E.
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Wheeler, C. M.

Wildin, George W.
Woods, G. M.
Woodward, R.
Wyke, J. W.
Wynne, F. E.
Yarnall, Jesse
Young, F. C.

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Anderson, Ross
Andrews, B. W.
Angel, A. J.
Anger, C. E.
Bagarelli, E.
Bailey, P. H.
Barnett, J. W.
Beekober, Charles, Jr.
Bell, D.
Bell, R. P.
Beswick, R. C.
Bitzel, H. J.
Bliler, M. W.
Bochert, Carl G.
Boland, Thomas
Bollinger, W. A.
Brown, R. J.
Bruner, H. L.
Bryant, L. J.
Burgess, W. C.
Burriss, H. E.
Burriss, Walter C.
Cable, T. H.
Campbell, W. T.
Carlson, H. O.
Casley, W. C.
Chapple, J. C.
Chase, D. K.
Colclaser, L. A.
Connell, J. R.
Corrigan, W. E.
Cotton, W. H.
Craig, James A.
Craig, John J.
Cramer, F. F.
Cravener, James H.
Dambach, W. E.
Davis, William B.
Deeds, James R.
Dittman, G. F.
Donaldson, James
Downing, W. T.
Dunkerly, E. R.
Dunsmoor, F. L.
Eaton, F. H.
Edsall, S. D.
Eichhorn, Ted F.
Emery, J. E.
Fair, J. M.
Farlow, G. B.
Fink, P. J.
Fisher, George W.
Flynn, E. E.
Foltz, W. D.
Forrester, J. B.
Foust, L. R.
Fowler, W. E., Jr.
Frauenheim, P. H.
Friend, R. A.
German, T. F.
Gilbert, J. B.
Gill, C. W.
Gillespie, J. V.
Goebel, M.
Gollmer, H. C.
Goodwin, A. E.
Gower, Robert
Grady, M. P.
Grimm, W. R.
Grove, C. S.
Hahn, H. A.
Harper, J.
Hester, J.
Hicks, L. W.
Hicks, W. A.
Hill, A. H.
Hockenberry, H. D.
Holt, James
Hopper, George
Hudson, T. D.
Hunter, D. C.
Hunter, Harry C.
Ingersoll, Maude
Jackman, W. A.
Jacobs, Arthur
Jeffrey, John

Jenets, E.
Jenny, A. S.
Johnson, Tom
Johnston, E. R.
Johnston, R. F.
Jones, Parker R.
Jones, Paul
Jones, R. T.
Junker, J.
Keane, F. M.
Kemmler, Edward C.
Kerth, John
Kohl, C. G.
Kouche, N. J.
Larson, W. E.
Latshaw, T. R.
Leaf, C. S.
Lehn, A. W.
Lewis, N. F.
Lewis, Ralph S.
Lewis, S. B.
Livingston, E. M.
Longabaugh, J. R.
Lower, R. C.
Maloney, J. J.
Marsh, E. W.
Maurer, E. L.
Melton, James
Mertz, Charles W.
Metzger, C. L.
Meyers, August J.
Miller, Bernard B.
Miller, R. E.
Miller, Ted Paul
Moeller, Frank J.
Montgomery, W. E., Sr.
Montgomery, W. E., Jr.
Moore, M. H.
Morgan, William
Mullen, M.
Mutter, John
Mycoff, George H.
McGinnis, P. B.
McPherson, R. W.
McVicker, J. W.
Nelson, W. S.
Nestor, T. E.
Odiorne, D. W.
O'Laughlin, M. J.
Oliver, W. E.
Paisley, R. M.
Papeski, L. E.
Peck, E. A.
Peirce, W. B.
Penn, C. D.
Pickels, H. D.
Prosser, David
Quinn, John J.
Recker C. N.
Reeve, George J.
Richardson, C. C.
Rider, H. C.
Rigatti, Gus
Robertson, A. S.
Robertson, M. R.
Robinson, H. J.
Rodgers, Joseph W.
Rowles, C. B.
Ruprecht, Phillip
Ruttles, E.
Ryce, Edwin S.
Salesbury, R. W.
Schachter, Harold
Schadel, H. M.
Schott, F. J.
Schrontz, S. B.
Schuch, H. C.
Severn, H. A.
Severn, John
Sexton, E. P.
Shelly, D. L.
Shepherd, W. B.
Sherron, John
Shropshire, Paul
Smith, Frank D.
Smith, R. B.
Smith, Sion B.
Smith, T. P.
Snyder, George S.
Sparks, H. D.
Stamm, J. Duncan
Stayduhar, Thomas A.
Stearns, Earl
Stearns, J. M.
Stearns, William S.
Stevens, A. R.
Stevenson, L. N.
Stewart, William
Stotler, Harvey K.
Strickler, F. M.
Sullivan, M. J.
Taubert, Herbert

Terkelson, B.
Thomas, C. H.
Tomlinson, C. E.
Tomlinson, J. H.
Tonkin, Robert
Tripp, W. C.
Tritoky, John
Walker, R. H.
Walton, H. R.
Ward, Thomas J.
Warrensford, F. S.
Watkins, C. M.
Waxman, J. H.
Weight, L. S.
Wilcox, A. S.
Williamson, J. A.
Winkler, A. H.
Wolf, Joseph F.
Van Horn, C. W.

PRESIDENT: As this is the Annual Meeting of our Club w will hurry through the business routine in order that you may not be unduly delayed in your enjoyment of the entertainment program.

At the last meeting an arrangement was made whereby a representative of the National Safety Council would be granted the privilege of the floor at this meeting. If he is present we will be glad to hear him for about ten minutes. As he does not seem to be present, an opportunity will be afforded him at a later stage in the program.

We will dispense with the roll call as we have a complete record of attendance in the registration cards.

If there is no objection we will dispense with the reading of the minutes of the last meeting.

I will ask the Secretary to read the list of proposals for membership.

SECRETARY: We have the following proposals for membership:

Fair, J. M., Engineer Maintenance of Way, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Gillum, J. S., Division Engineer, Pittsburgh Division, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Harrison, Albert, Chemist, Union Railroad Company, 1227 Bell Avenue, North Braddock, Pa. Recommended by Charles P Harbaugh.

Hellriegel, W. H., Traffic Representative, P. & W. Va. Ry Co., Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.

McTighe, B. J., Superintendent Heat Treating, Hubbard & Company, 5253 Carnegie Avenue, Pittsburgh, Pa. Recommended by J. F. W. Kruse.

Payne, J. R., Salesman, J. B. Sipe & Company, 1739 Barr Avenue, Crafton, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Smith, T. R., Sales Representative, Oakite Products, Inc., 5707 Rural Street, Pittsburgh, Pa. Recommended by Harry Courtney.

Van Nort, C. W., Superintendent Freight Transportation, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Peirce, W. B., Works Manager, Flannery Bolt Company, Bridgeville, Pa. Recommended by A. Stucki.

PRESIDENT: In accordance with our By-Laws these proposals will be referred to the Executive Committee and upon approval by that Committee the gentlemen will become members without further action of the Club.

Mr. Secretary, are there any announcements?

SECRETARY: The following communications have been received, which may be of interest to the Club:

"Philadelphia, Penn., Oct. 25, 1934.

"John D. Conway,

Secty, Pittsburgh Railway Club, Oliver Bldg., Pgh.,

Regret I can not be at meeting tonight. Please congratulate President Dambaugh for me and wish Rufus Flinn a successful administration. Hope you all have an enjoyable evening.

"Frank J. Lanahan."

THE UNIVERSITY OF PITTSBURGH
Pittsburgh, Pennsylvania

October 19, 1934.

Mr. J. D. Conway, Secretary,
The Railway Club of Pittsburgh,
1941 Oliver Building,
Pittsburgh, Pennsylvania.

Dear Mr. Conway:

As Secretary of your organization may I ask that you read the attached notice in your next meeting. I believe that it will be of general interest to the members of your organization.

Since the service of this placement bureau is free you will not be furthering the interests of any commercial bureau by reading it, but rather be assisting in a goodwill program as instituted by the University of Pittsburgh in favor of the citizens and industries of Pittsburgh. About twenty thousand of these citizens are graduates of this University.

Your co-operation will be greatly appreciated and if possible I would appreciate hearing from you as to the manner in which this notice was received by the members of your organization. Of course this last request is not a mandatory one, but I believe that a record of the reaction would be of great benefit to this bureau.

Thanking you for this favor and assuring you of my willingness to be of assistance to you and your organization in any way possible, I am

Very truly yours,

(Signed) J. C. BARTON,
Director.

The University of Pittsburgh wishes to acquaint you with the fact that it maintains a Placement Bureau for the benefit of industry and our twenty thousand graduates. The purpose of this bureau is to assist in the project of finding positions for men and men for positions.

We have on file men of all ages with a varying degree of experience and our records include graduates from the following University schools:

College	School of Pharmacy
School of Business Administration	School of Dentistry
School of Education	School of Law
School of Engineering and Mines	Graduate School
School of Medicine	Downtown Division

This service is free to both the person referred and to industry, and the bureau would aprpeciate it if you would avail yourself of this service and not hesitate to call upon us when we may be of assistance.

J. C. BARTON, Director,
Placement Bureau.

801 Cathedral of Learning
(Mayflower 3500)

PITTSBURGH ADVERTISING CLUB

Pittsburgh, Pa.

October 24, 1934.

Mr. J. D. Conway, Secretary,
Pittsburgh Railway Club,
Oliver Building,
Pittsburgh, Pa.

Dear Mr. Conway:

In line with our telephone conversation today, I am enclosing a brief notice which I would appreciate very much having read before the Railway Club meeting tomorrow evening.

We feel that Mr. Dunn is going to give us a real worthwhile talk on matters of vital interest to the railroad men and to the durable goods industry as represented in the Pittsburgh district.

Cordially yours,

K. E. KELLENBERGER,
Vice President.

Mr. Samuel O. Dunn, Chairman of the Board of the Simmons-Boardman Publishing Company and Editor of Railway Age, will address the Pittsburgh Advertising Club on Tuesday evening, November 13, at 8:00 P. M., at the Keystone Hotel. Mr. Dunn advises that he will talk about general business and the railroad situation and their relationship to national recovery.

This meeting of the Pittsburgh Advertising Club is an open meeting and a cordial invitation is extended to all members and guests of the Pittsburgh Railway Club to be present that evening. An informal dinner will be given in Mr. Dunn's honor at 6:30 P. M. for those caring to attend the dinner before the regular meeting takes place. Dinner tickets will be $1.50 each and reservations can be made for parties at special tables by calling or writing to Mr. K. E. Kellenberger, Union Switch & Signal Company, Swissvale, Pa.

SECRETARY: Since our last meeting we have received information of the death of the following members of the Club:

John G. Whitmore, Division Counsel, B. & O. R. R., Ridgway, Pa., died August 12, 1934; I. B. Sinclair, Special Agent, Pennsylvania Railroad, Pittsburgh, Pa., died May 29, 1934; E. J. Deckman, President, E. J. Deckman Company, Pittsburgh, Pa., died October 6, 1934, and J. H. Lindsay, Division Accountant, B. & O. R. R., Pittsburgh, Pa., died October 23, 1934.

PRESIDENT: An appropriate memorial minute will appear in the next issue of the Proceedings.

This brings us up to the Annual Reports of the Officers. First will be the Annual Report of the Treasurer, which will be read by the Secretary.

TREASURER'S REPORT

To the Officers and Members of

The Railway Club of Pittsburgh.

Gentlemen:

I herewith submit my report for the year ended October 25, 1934.

ON HAND AND RECEIPTS

Cash on hand, October 26, 1933	$ 953.56	
Moneys received from J. D. Conway, Secretary, from October 26, 1933, to October 25, 1934	3,276.76	
Interest on Bonds	147.50	
Proceeds from sale of one 3⅛% $1,000.00 U. S. Treasury Bond	1,016.36	
Total Receipts		$5,394.18

DISBURSEMENTS

Paid on Vouchers No. 803 to 828, inclusive	$4,053.72	
Federal tax on 26 checks at 2 cents each	.52	
Total Disbursements		4,054.24
Balance		1,339.94

RESOURCES

Two U. S. Liberty Bonds at $1,000.00 each	2,000.00	
One U. S. Treasury Bond at purchase price	949.39	
Cash Balance	1,339.94	
Total Resources		$4,289.33

Note—The sale of the U. S. Treasury Bond above referred to was made at a profit of $66.96 to The Railway Club of Pittsburgh, the original cost of this bond being $949.40.

E. J. SEARLES,
Treasurer.

APPROVED:

EXECUTIVE COMMITTEE,
FRANK J. LANAHAN,
Chairman.

PRESIDENT: We will now have the Annual Report of the Secretary.

SECRETARY'S REPORT

Pittsburgh, Pa., October 25, 1934.

To the Officers and Members of
The Railway Club of Pittsburgh.

Gentlemen:

The following is a summary of membership and financial statement for the fiscal year ended October 25, 1934:

Membership reported last year	869	
Received into membership during year	64	
Reinstated	5	
		938
Suspended	108	
Resigned	57	
Loss of Address	7	
Deaths reported during year	20	
		192
Present membership		746

Of the above membership four are honorary. They are: D. C. Buell, D. F. Crawford, Samuel O. Dunn and John A. Penton.

DECEASED MEMBERS

Name	Died
John P. Bourke	January 17, 1934
C. W. Caldwell	February 22, 1934
J. T. Campbell	November 12, 1933
S. L. Church	September 11, 1934
Jacob C. Coleman	July 10, 1933
E. J. Deckman	October 6, 1934
John T. Ferrick	February 2, 1934
Charles E. Hale	April 16, 1934
E. S. Harger	April 21, 1934
John E. Hughes	August 20, 1934
R. P. Keenoy	August 23, 1934
Joseph H. Kummer	March 18, 1934
Carl L. Laughner	October 31, 1933
J. H. Lindsay	October 23, 1934

T. A. Milby	July 13, 1934
Arthur D. Pringle	June 20, 1933
Harry E. Sheets	July 27, 1934
I. B. Sinclair	May 29, 1934
F. H. Stark	June 30, 1934
John G. Whitmore	August 12, 1934

RECEIPTS

In hands of Treasurer at close of year	$4,852.35	
From advertisements	642.50	
From dues	2,148.00	
From sale of Proceedings	88.76	
Smoker Tickets and Dinner, October 26, 1933	337.50	
Miscellaneous sources	10.00	
Profit on sale of one $1,000 3⅛% U. S. Treasury Bond	66.96	
Interest on Bonds	147.50	
Received from Keystone National Bank	50.00	
		$8,343.57

DISBURSEMENTS

Printing Proceedings, notices, mailing, etc	$1,650.75	
Hall, luncheons, cigars, etc	725.00	
Reporting Proceedings	180.00	
Dinner, Entertainment, Smoker, etc., October 26, 1933	338.30	
Salaries and advertising expense	1,064.25	
Moving pictures	24.00	
Messenger service—affidavits, etc	18.50	
Premium on bonds—Treasurer and Secretary	14.00	
Floral pieces	25.32	
Incidentals	13.60	
Federal tax on checks	.52	
		4,054.24
Net Balance		$4,289.33

Note—Balance is made up of $1,339.94 cash and two U. S. $1,000.00 4¼% Liberty Bonds and one U. S. $1,000.00 3⅛% Treasury Bond at cost of $949.39.

J. D. CONWAY,
Secretary.

APPROVED:

EXECUTIVE COMMITTEE,
FRANK J. LANAHAN,
Chairman.

ON MOTION the Reports of the Secretary and Treasurer are approved.

SECRETARY: One comment on the Reports, as indicating the condition of the Club, I think should be made at this time. In comparison with other organizations of a similar nature I think you will agree that we are in much bettei than the average condition. But there has been some falling off in the membership, and there is quite a considerable number of our members now on our rolls who are back in their dues one and two years, and a few even longer. We all know the difficulties that have beset railroad men especially in recent years and the Club wishes to assist them in every way possible. And I would like to suggest a certain reciprocity in this help business by asking those members behind in their dues to send us a part of the back dues, if you are not able to send the full amount, and we will appreciate your co-operation. For the Club is in need of support as well as any individual, these days.

PRESIDENT: I fully subscribe to what your Secretary has just said. But in addition we should make a drive for new members, in addition to having the old members pay up.

We have audited the accounts of the Secretary and Treasurer, and find them correct as reported.

FINANCE COMMITTEE,
E. A. RAUSCHART, Chairman,
E. EMERY,
HAROLD F. DUNBAR,
J. L. O'TOOLE.

Next in order is the Report of the Tellers of Election.

SECRETARY: The Report of the Tellers of Election is as follows:

Total number of votes cast 194, and the vote in each case unanimous for the gentlemen named.

PRESIDENT—R. H. Flinn, General Superintendent, Pennsylvania Railroad, Pittsburgh, Pa.

FIRST VICE-PRESIDENT—C. M. Yohe, Vice-President, Pittsburgh & Lake Erie Railroad Company, Pittsburgh, Pa.

SECOND VICE-PRESIDENT—E. A. Rauschart, Mechanical Superintendent, Montour Railroad Company, Coraopolis, Pa.

SECRETARY—J. D. Conway.

TREASURER—E. J. Searles, Manager, Schaefer Equipment Company, Pittsburgh. Pa.

EXECUTIVE COMMITTEE—Frank J. Lanahan, Chairman; A. Stucki, Samuel Lynn, D. F. Crawford, G. W. Wildin, W. S. McAbee, E. W. Smith, Louis E. Endsley, F. I. Snyder, C. O. Dambach.

SUBJECT COMMITTEE*—R. P. Forsberg, Chairman, 3 years; D. W. McGeorge, 1 year; John B. Wright, 2 years.

RECEPTION COMMITTEE*—G. M. Sixsmith, Chairman, H. E. Graham, 1 year; J. B. Baker, Walter C. Sanders, G. A. Blackmore, J. S. Lanahan, 2 years; J. A. Warfel, W. C. Burel, 3 years.

ENTERTAINMENT COMMITTEE*—James R. Geddes, Chairman, 2 years; E. H. Holmes, C. C. Clark, 3 years.

FINANCE COMMITTEE*—F. X. Christy, Chairman, E. Emery, Harold F. Dunbar, 1 year; J. L. O'Toole, 2 years; G. W. Honsberger, 3 years.

MEMBERSHIP COMMITTEE*—Herbert J. Watt, Chairman, T. F. Sheridan, Donald O. Moore, 1 year; A. B. Severn, W. P. Buffington, 2 years; T. E. Britt, R. S. Bull, A. F. Coulter, T. R. Dickinson, D. K. Orr, 3 years.

SECRETARY: I might say, in connection with the Subject Committee, that Mr. R. P. Forsberg has been Chairman of that Committee for several years, and he has been so efficient and thorough and entirely satisfactory in his work that they were not willing to let him off.

PRESIDENT: These gentlemen whom you have elected to carry on the affairs of this Club are all well known to you, and I will shortly ask them to come forward and make their personal appearance that they may be properly welcomed.

Before this I want to give renewed expression to my deep thanks for and appreciation of the hearty co-operation I have received from the members of this Club ever since I have been

*In addition to newly elected committee members, the above list also gives names of those previously elected whose terms of office have not yet expired.

honored by election as one of your officers, and particularly during this past year when you honored me with the highest office at your command. And I beseech you that you extend the same loyal support to my successors in office that you have always accorded me.

Your President-elect, Mr. Rufus H. Flinn, General Superintendent, Pennsylvania Railroad, has been very active in the affairs of this Club since he came to Pittsburgh, and prior to that time he was an enthusiastic member of the Central Railway Club of Buffalo. In view of that he should be well qualified to act as your presiding officer for the coming year. I will ask him to come to the platform and say a few words.

MR. R. H. FLINN: Gentlemen: I can only say to you that I appreciate very highly this honor which you have bestowed upon me. There has been a good deal of underhanded work in the past week, for a number of my good friends have been wanting to know what I was going to pay for votes. I told them this was going to be one election that was honest and I would not pay a cent to anybody for his vote.

(NOTE: The fact that Mr. Flinn had no opposition made this promise the easier).

Seriously speaking, however, I stand here before you with a feeling of a good deal of responsibility on my shoulders, as I look back over a line of very illustrious predecessors, some of whom I see sitting in the audience, and I know that I will have to make every effort to serve you to the very best of my ability to carry out the traditions of this Club, of which I have had the pleasure of being a member for a number of years, and of which I hope I will be a member for many more years.

Your Secretary spoke about increasing the membership. That is one of the things where we have got to put our shoulders to the wheel and get busy and bring new members into this Club. I leave that thought with you because I feel sure there will be some activity along that line that everybody should get in on.

One thing, which your officers need above all others, is the support of the membership. Your officers cannot carry on unless they have the whole hearted support of all the members. You have given it very largely for the last year and it is my hope that you will still continue to further every activity of the Club and make it not only easier for the officers but make for yourselves a very much better Club—if that be possible—than it is today.

I will endeavor to propose ideas to increase the activities of the Club and help along, but I think one thing is needed right now, today, and I wish I had thought of it before the Secretary read the list of new members, and that is that when the new members are announced they should rise before the Club and be recognized so the other members of the Club will know who they are. You may know them but a great many of the members, and especially a great many of the younger men, do not know them and every new member ought to stand up where he can be seen so the other members will know what he looks like.

There may be some other things we can do to help out, and I will be glad of your suggestions because I can make the Secretary do it. I understand of course that your Secretary is responsible, theoretically speaking, to the Executive Committee. They are the people that determine the policy of the Club and I am only the servant of the Executive Committee and of you and I can only do what you want done. But at least I ought to have the privilege of suggesting an idea or two to the Secretary.

To get back to my little swan song, I just want to thank you once again for the privilege and the pleasure of being here with you and for the opportunity you have given me to serve you, and to express the hope that we will all have a good year together. I thank you.

PRESIDENT: The First Vice-President elect is Curtis M. Yohe, Vice-President, Pittsburgh & Lake Erie Railroad. He does not seem to be present.

Second Vice-President, Mr. E. A. Rauschart, Mechanical Superintendent, Montour Railroad. I heard a man say he hadn't had a failure in twelve years. That sort of man ought to be a worthy addition to our official family.

MR. E. A. RAUSCHART: Mr. President and Members of The Railway Club: I sure appreciate the honor of being elected Vice-President of the Railway Club of Pittsburgh, and I promise that I will continue to work for the best interest of the Club. I am glad to be with you and I am also glad the election is over as I had a great many telephone calls and letters asking me how much I would pay for votes. I thank you.

PRESIDENT: We have heard more or less from our Secretary, Mr. Conway, but he can at least make his bow.

MR. J. D. CONWAY: (Bows and says nothing).

PRESIDENT: Mr. E. J. Searles, our Treasurer. We never hear from him and he even will not read his own report. We must surely hear from him at this time.

MR. E. J. SEARLES: I am afraid you will have to excuse me; I am no speech maker.

PRESIDENT: This completes the business part of our program but before we go to the entertainment feature I would like to introduce Mr. A. G. Pack, Chief Inspector, Bureau of Locomotive Inspection, Interstate Commerce Commission, who has come all the way from Washington, D. C., to be with us tonight. Mr. Pack is well known to most of us but I would like to have him come forward and say a few words or at least make a bow.

MR. A. G. PACK: Friends of the Railway Fraternity and the Railway Supply organizations: It is a great pleasure for me to be here with you this evening. But I did not come prepared to say anything. I only want to tell you that I am always glad and enjoy meeting with railroad men wherever they may congregate. I want to say just one thing. I have been with the government for twenty-three years and I have never been too busy to see a railroad man or a railway supply man and I want you to come and see me just as often as you can. I thank you.

PRESIDENT: I will now turn the evening over to our Entertainment Committee, in charge of Mr. Conway.

SECRETARY CONWAY: Our retiring President is not going to get off as easy as he thinks. We have with us a gentleman who is going to make a few remarks and before we proceed with our entertainment I am going to call on a member of our Executive Committee, a Past President of this Club, one known to everybody present, Mr. Samuel Lynn.

MR. SAMUEL LYNN: Mr. President, Members of the Railway Club and Guests: I feel somewhat embarrassed at having to appear before you on this occasion as I am not at all a fluent orator and as Mr. Conway has already told you of the absence of our silver tongued orator, Mr. F. J. Lanahan, who on a moment's notice can get up and make an address on any subject with apparently no effort at all, I was very much surprised when our Secretary informed me that I was selected to "pinch hit" for Mr. Lanahan. After some thought, this looks like a frame-up by our good friend Frank and the Secretary, and the only reason I can assign for it is that Frank being unable to be with us on account of being out of town on business, it was his desire to have a fellow townsman from the "sacred precincts of McKees Rocks" take his place on the program. I know that if he could be here himself he would paint the glories of those sacred precincts in all the colors of the rainbow and I feel sure that everyone is sorry because of his absence tonight, at least, I can truthfully say that I am very sorry. However, I will do the best I can to represent him.

You have all heard the reports of our Secretary and Treasurer and it is not necessary for me to take up your time tonight to go into detail on these reports as they will be published in the regular proceedings and I know you gentlemen are waiting for Mr. Conway to put on his show. Taking into consideration the trying times through which this Club and all other organizations are passing, I am sure that the reports are very gratifying to all of our officers and members. This condition is due to the careful attention of the officers whom you selected to conduct the affairs of this Club.

My real job tonight is to pay tribute to our retiring President, who has served this Club for some years on various Committees and as First and Second Vice-President and finally as President.

Mr. Dambach, the time has arrived when you must hand over the gavel to your successor, Mr. Flinn. In passing it is needless for me to say that you have had a very successful year as the President of this Club. We have had splendid subjects during your term of office and a good attendance of the members at all of the meetings and you can now turn the office over to the new President, who, I know, with the assistance of the officers associated with him, together with his Committees, will maintain the high standard which the Club now has.

Following the usual custom, a Committee was appointed to select a suitable testimonial to be presented to you as retiring President at the annual meeting, which we sincerely hope will be pleasing to you and your good wife. I esteem it an honor and great privilege in behalf of the officers and members of this

Club to present you with this hall clock and as the years go by may it turn your thoughts back to your many activities and your pleasant associations with the Railway Club of Pittsburgh. It is my pleasure to present this gift to you with the good wishes of all officers and members of the Railway Club of Pittsburgh.

NOTE: At this point the drapes were removed from a very handsome hall clock.

PRESIDENT: Mr. Lynn and Friends: I know you all sympathize with me, as my feelings overwhelm me at this moment, in the utter inadequacy of my vocabulary to adequately express my feeling of gratitude and appreciation. I can only say I thank you.

SECRETARY CONWAY: The entertainment which will be presented to you tonight has been prepared for your delectation by Maude Ingersoll Productions, whom we have known and appreciated in that capacity before.

Mr. Jacob W. Hoover, Chairman, Entertainment Committee, requested Secretary Conway to conduct the entertainment program, which was presented as follows:

Orchestra—Composed of five persons.

Opening Number—Zylaphone Solo.

Hollywood Blonds—Pony Ballet—"I'm Yours For Tonight."

Eloise Rutter—Song—"Sleepy Head."

DeMonte Sisters—Song and Dance—"How 'm I Doing."

Marcie Davis—Acrobatic Dance.

Step Brothers—Dummies from a clothing store, demonstrating the latest 1934 models and showing the correct thing in dress.

Helen Wendler—Strut Number.

Peggy Walace—"You Nasty Man."

Hollywood Blonds—The Boop Boop A Do Girls.

Step Brothers—Challenge Tap.

Helen Wendler—"Beach of Waikiki."

Catherine Elm—From the band doing a trumpet solo.

Harold Teen and Shadow—In person.

Hollywood Blonds—Jumping the rope.

Eloise Rutter—Community Singing.

Mr. M. P. Grady, Foreman, Pennsylvania Railroad, Canton, Ohio, being present was called upon and recited some two or three very intertaining poems.

At the close of the entertainment the members and guests were ushered into the dining room where a delightful luncheon was served cafeteria style and a social hour concluded a most enjoyable evening.

J. D. CONWAY, Secretary.

CONSTITUTION

ARTICLE I

The name of this organization shall be "THE RAILWAY CLUB OF PITTSBURGH."

ARTICLE II

OBJECTS

The objects of this Club shall be mutual intercourse for the acquirement of knowledge, by reports and discussion, for the improvement of railway operation, construction, maintenance and equipment, and to bring into closer relationship men employed in railway work and kindred interests.

ARTICLE III

MEMBERSHIP

SECTION 1. The membership of this Club shall consist of persons interested in any department of railway service or kindred interests, or persons recommended by the Executive Committee upon the payment of the annual dues for the current year.

SEC. 2. Persons may become honorary members of this Club by a unanimous vote of all members present at any of its regular meetings, and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

ARTICLE IV

OFFICERS

The officers of this Club shall consist of a President, First Vice President, Second Vice President, Secretary, Treasurer, Finance Committee consisting of five or more members, Membership Committee consisting of seven or more members, Entertainment Committee consisting of three members, Reception Committee consisting of six or more members, Subject Committee consisting of three or more members, and an Elective Executive Committee of three or more members. The officers named shall serve a term of one year from date of their election, with the exception of the Finance, Membership, Entertainment, Reception and Subject Committees; the term of office of these committees shall be specified at the time of the Annual Election, but the term of office of the members of such committees shall not exceed three years.

ARTICLE V

DUTIES OF OFFICERS

SECTION 1. The President shall preside at all regular or special meetings of the Club and perform all duties pertaining to a presiding officer; also serve as a member of the Executive Committee.

SEC. 2. The First Vice President, in the absence of the President, will perform all the duties of that officer; the Second Vice President, in the absence of the President and First Vice President, will perform the duties of the presiding officer. The First and Second Vice President shall also serve as members of the Executive Board.

SEC. 3. The Secretary will attend all meetings of the Club or Executive Committee, keep full minutes of their proceedings, preserve the records and documents of the Club, accept and turn over all moneys received to the Treasurer at least once a month, draw checques for all bills presented when approved by a majority of the Executive Committee present at any meetings of the Club, or Executive Committee meeting. He shall have charge of the publication of the Club Proceedings and perform other routine work pertaining to the business affairs of the Club under the direction of the Executive Committee.

SEC. 4. The Treasurer shall receipt for all moneys received from the Secretary, and deposit the same in the name of the Club within thirty days in a bank approved by the Executive Committee. All disbursements of the funds of the Club shall be by checque signed by the Secretary and Treasurer.

SEC. 5. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds. The elective members of this Committee shall also perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so.

SEC. 6. The Finance Committee will have general supervision over the finances of the Club, and perform such duties as may be assigned them by the President or First and Second Vice Presidents.

SEC. 7. The Membership Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents and such other duties as may be proper for such a committee.

Sec. 8. The Entertainment Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents, and such other duties as may be proper for such a committee.

ARTICLE VI

ELECTION OF OFFICERS

Section 1. The officers shall be elected at the regular annual meeting as follows, except as otherwise provided for:

Sec. 2. Printed forms will be mailed to all the members of the Club, not less than twenty days previous to the annual meeting, by the elective members of the Executive Committee. These forms shall provide a method, so that each member may express his choice for the several offices to be filled.

Sec. 3. The elective members of the Executive Committee will present to the President the names of the members receiving the highest number of votes for each office, together with the number of votes received.

Sec. 4. The President will announce the result of the ballot and declare the election.

Sec. 5. Should two or more members receive the same number of votes, it shall be decided by a vote of the members present, by ballot.

ARTICLE VII

AMENDMENTS

Amendments may be made to this Constitution by written request of ten members, presented at a regular meeting and decided by a two-thirds vote of the members present at the next regular meeting.

BY-LAWS

ARTICLE I

MEETINGS

SECTION 1. The regular meetings of the Club shall be held at Pittsburgh, Pa., on the fourth Thursday of each month, except June, July and August, at 8 o'clock P. M.

SEC. 2. The annual meeting shall be held on the fourth Thursday of October each year.

SEC. 3. The President may, at such times as he deems expedient, or upon request of a quorum, call special meetings.

ARTICLE II

QUORUM

At any regular or special meeting nine members shall constitute a quorum.

ARTICLE III

DUES

SECTION 1. The annual dues of members shall be Two Dollars, payable in advance on or before the fourth Thursday of September each year.

SEC. 2. The annual subscription to the printed Proceedings of the Club shall be at the published price of One Dollar. Each member of the Club shall pay for both dues and subscription. Dues and subscription paid by members proposed at the meetings in September or October shall be credited for the following fiscal year.

SEC. 3. At the annual meeting members whose dues and subscription are unpaid shall be dropped from the roll after due notice mailed them at least thirty days previous.

SEC. 4. Members suspended for non-payment of dues shall not be reinstated until all arrearages have been paid.

ARTICLE IV

ORDER OF BUSINESS

1—Roll call.
2—Reading of the minutes.
3—Announcements of new members
4—Reports of Committees.
5—Communications, notices, etc.
6—Unfinished business.
7—New business.
8—Recess.
9—Discussion of subjects presented at previous meeting
10—Appointment of committees
11—Election of officers.
12—Announcements.
13—Financial reports or statements
14—Adjournment.

ARTICLE V

SUBJECTS—PUBLICATIONS

SECTION 1. The Subject Committee will provide the papers or matter for discussion at each regular meeting.

SEC. 2. The Proceedings or such portion as the Executive Committee may approve shall be published (standard size, 6x9 inches) and mailed to the members of the Club or other similar clubs with which exchange is made.

ARTICLE VI

The stenographic report of the meetings will be confined to resolutions, motions and discussions of papers unless otherwise directed by the presiding officer.

ARTICLE VII

AMENDMENTS

These By-Laws may be amended by written request of ten members, presented at a regular meeting, and a two-thirds vote of the members present at the next meeting.

In Memoriam

E. J. DECKMAN

Joined Club February 28, 1908

Died October 6, 1934

J. H. LINDSAY

Joined Club January 23, 1930

Died October 23, 1934

I. B. SINCLAIR

Joined Club January 28, 1932

Died May 29, 1934

JOHN G. WHITMORE

Joined Club December 22, 1927

Died August 12, 1934

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Of Official Proceedings—Railway Club of Pittsburgh, published Monthly, except June, July and August, at Pittsburgh, Pa , for October 1, 1934.

STATE OF PENNSYLVANIA }
COUNTY OF ALLEGHENY } ss:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. D. Conway, Secretary, who having been duly sworn according to law, deposes and says that he is the Editor and Publisher, of the Official Proceedings—Railway Club of Pittsburgh.

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(Seal) AGNES B. SHAW, Notary Public.
(My commission expires March 9, 1935.)

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

$1.00 Per Year 25¢ Per Copy

Vol. XXXIV. NOVEMBER 22, 1934. No. 1.

COR-TEN—A HIGH TENSILE CORROSION RESISTING STEEL FOR RAILROAD EQUIPMENT

By R. F. JOHNSTON (1) and G. N. SCHRAMM (2)

(1) Operating Department, American Sheet & Tin Plate Co., Pittsburgh, Pa.

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OFFICIAL PROCEEDINGS
OF

The Railway Club of Pittsburgh

Organized October 18, 1901

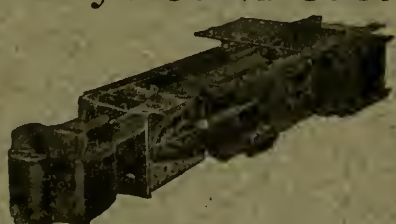
Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

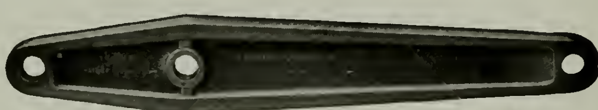
Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 1

Pittsburgh, Pa., Nov. 22, 1934

$1.00 Per Year
25c Per Copy





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OF

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Organized October 18, 1901

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PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

PROCEEDINGS OF MEETING
NOVEMBER 22nd, 1934

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock P. M., with President R. H. Flinn in the chair.

Attendance, as shown by registration cards, 354, as follows:

MEMBERS

Adams, Frank W.
Adrian, J. H.
Allen, Harvey
Allison, John
Arnold, J. J.
Baker, J. B.
Balzer, C. E.
Bancroft, A. G.
Beam, E. J.
Beeson, H. L.
Bell, D. H.
Berg, Karl
Bishop, H. G.
Bisi, Charles W.
Bone, H. L.
Bowen, C. R.
Britt, T. E.
Browne, Bard
Bruner, Harold L.
Buhrmester, H. C.
Burel, W. C.
Burk, G. C.
Butcher, F. M.
Carlson, L. E.
Carmody, J. J.
Carr, T. W.
Carroll, D. C.
Carson, John
Case, H. D.
Chesley, J. O.
Chipley, G. R.
Christy, F. X.
Cipro, Thomas
Clokey, John
Clowes, W. K.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Courtney, H.
Crow, C. C.
Cruikshank, J. C.
Dalzell, W. E.
Dambach, C. O.
Davies, James
Davis, Charles S.
Denehey, R. H.
Dickinson, T. R.
Dickson, K. B.
Diven, J. B.
Dixon, C. P.
Downes, D. F.
Durell, W. A.
Durkin, James E.
Edmonston, G. F.
Ely, J. L.
Emery, E.
Emsheimer, Louis
Endsley, Prof. Louis E.
Escott, Charles M.
Fair, J. M.
Farmer, C. C.
Flinn, R. H.
Foard, E. A.
Forsberg, R. P.
Fox, George W.
Fox, M. C.
Frauenheim, A. M.
Frauenheim, P. H.
Freshwater, F. H.
Fry, L. H.
Fulks, B. M.
Furch, George J.
Gauvey, Fred J.
Gemmell, R. W.
George, R. H.
Gilbert, William J.
Gillespie, J. Porter
Gray, Guy M.
Gray, H. H.
Greek, Joseph
Guy, W. S.
Hackett, C. M.

Hansen, William C.
Harbaugh, C. P.
Harper, J. T.
Harrison, Albert
Hayward, C. H.
Henning, C. C.
Henry, S. R.
Hepburn, P. W.
Herrold, A. E.
High, E. W.
Hilstrom, A. V.
Holmes, E. H.
Honsberger, G. W.
Hoover, J. W.
Hornefius, S. R.
Huber, H. G.
Hykes, W. H.
Israel, E. J., Jr.
Jenness, D. H.
Jennings, A. S.
Johnson, William M.
Kapp, A. C.
Kashner, W. C.
Kaup, H. E.
Kelly, L. J.
Kentlein, John
Kerr, C. R.
Kraus, Raymond E.
Kromer, William F.
Kulp, J. G.
Lanahan, Frank J.
Lanahan, J. S.
Leet, C. S.
Lehr, H. W.
Litty, J. H.
Logan, J. W., Jr.
Longdon, C. V.
Longstreth, W. L.
Loucks, W. V.
Lowry, William F., Jr.
Lynn, Samuel
Maliphant, C. W.
Masterman, T. W.
Matchneer, W. W.
Matthews, R. J.
Mellon, C. B.
Merz, G. L.
Metzgar, Herbert T.
Miller, John
Mitchell, W. S.
Moir, W. B.
Moore, Donald O.
Morgan, Homer C.
Murray, Stewart
Mussey, D. S.
Myer, Charles R.
McAbee, W. S.
McCormick, E. S.
McCracken, C. M.
McCrossin, C. D.
McGeorge, D. W.
McIntyre, R. C.
McKinley, J. T.
McKisson, R. W.
McLaughlin, H. B.
McNamee, W.
McNary, Frank R.
McNeal, A. R.
Niklaus, C. G.
O'Leary, J. J.
Orbin, Joseph N.
Orr, D. K.
Overholt, B. C.
Paisley, F. R.
Palmer, E. A.
Peebles, A. T.
Peel, J. E., Jr.
Peirce, W. B.
Phillips, W. A.
Phillips, William E.
Pickard, S. B.
Posteraro, S. F.
Pringle, J. L.
Purchard, Paul
Ralston, J. A.
Rauschart, E. A.
Rebstock, J. B.
Reed, E. S.
Reed, M. R.
Reno, David A.
Renshaw, W. B.
Richardson, E. F.
Rodkey, C. C.
Rowles, H. N.
Rowley, C. R.
Ryan, D. W.
Ryan, James M.
Schadt, A. D.
Schrecongost, C. P.
Searles, E. J.
Sekera, C. J.
Seltman, O. W.

Sersch, J. G.
Severn, A. B.
Shackelford, L. P.
Sharpless, G. G.
Sheridan, T. F.
Shingledecker, J. C.
Shultz, Leo W.
Shuman, F. R.
Shuster, W. W.
Sixsmith, G. M.
Snyder, F. I.
Snyder, J. C.
Snyder, J. L.
Spencer, Albert C.
Stevens, R. R.
Stevenson, R. F.
Stratford, C. T.
Suffern, R. J.
Sullivan, P. W.
Sutherland, Lloyd
Swope, B. M.
Taylor, H. P.
Ternent, H. J.
Trax, L. R.
Triem, W. R.
Tryon, I. D.
Turner, A. L.
Tuttle, C. L.
Van Blarcom, W. C.
Van Nort, C. W.
Walsh, Joseph J.
Walton, W. K.
Warfel, J. A.
Wark, J. M.
Waterman, E. H.
Watt, Herbert J.
Weaver, W. Frank
Webster, H. D.
West, Troy
Wikander, O. R.
Wildin, George W.
Wilson, J. R.
Wilson, W. S.
Wisegarver, F. H.
Williams, O. J.
Winter, Paul S.
Wolcott, L. M.
Woollen, A. H.
Wright, John B.
Wright, O. L.
Wurts, T. C.
Yarnall, Jesse

VISITORS

Ainsworth, J. H.
Ashcraft, C. E.
Babb, R. V.
Bachfeldt, E. H.
Bakker, H. E.
Banta, M. H.
Barber, N. H.
Barr, S. T.
Baumann, E. G.
Blocher, W. H.
Bogoviak, Joseph
Bole, T. M.
Bowman, John J.
Bradley, H. J.
Brown, Robert H.
Burson, H. A.
Carbaugh, H. W.
Cayton, J. H.
Christy, G. J.
Clark, H. C.
Coakley, J. A.
Connolly, R. D.
Cotton, C. S.
Cox, George P.
Cox, W. E.
Crawford, Burt H.
Culton, James L.
Davies, R. W.
Davis, W. A.
Dibble, Robert H.
Dunham, C. W.
Echols, P. P.
Eckels, W.
Egly, M. J.
Emerson, Charles O.
Ferguson, George
Finger, P. E.
Flaherty, J. H.
Forrester, J. B.
Fowler, W. E., Jr.
Francis, C. B.
Gardner, K. C.
Geiser, H. M.
Gold, J. D.

Goodwin, E. G.
Tracey, J. B. A.
Greulich, G. G.
Griffin, Gerald P.
Haddock, D. T.
Hankins, Cyrus
Hartman, E. C.
Hartman, F. V.
Hayden, R. D., Sr.
Herter, F. J.
Hill, A. H.
Hoerner, A. S.
Hoffman, C. F.
Hogland, G. O.
Howell, F. M.
Hunt, Roy A.
Ihrig, Howard K.
Johnston, R. F.
Jones, John E.
Kane, Clarence G.
Kelin, A. W.
Kimpel, H. C.
Knable, G. Elkins
Krouse, G. N.
Kurtz, B. F.
Lamoree, J. K.
Larabee, C. P.
Leech, J. O.
Leonard, G. I.
Lewis, S. B.
Marble, Robert A.
Miller, F. F.
Moore, C. A.
Moore, M. B.
McCauley, William
McCoy, A. E.
McLaughlin, George G.
McIntyre, R. C.
Nagel, C. F., Jr.
Oswald, Louis W.
Pickels, H. D.
Priest, H. M.
Read, A. A.
Reding, H. W.
Reich, R. H.
Reynolds, D. E.
Rohyans, A. V.
Ross, J. W.
Rupp, M. F.
Saylor, N. A.
Saylor, R. B.
Schramm, G. N.
Smith, Sion B.
Smith, W. H.
Stanford, Tex.
Statlerson, Ewart
Stay, T. D.
Stevenson, L. N.
Stewart, J. D.
Strauss, Jerome
Sturm, R. G.
Templin, R. L.
Troxell, H. K.
Waldschmidt, E. K.
Ward, Frederic R.
Wareham, J. K.
Weigel, M. P.
Wickerham, F. A.
Wiechelt, W. L.
Wilber, H. B.
Wilt, Howard H.
Witney, William L.
Wolff, Frank W.
Yetso, J. J.

A "Community Sing," with Mr. Will A. Davis leading the singing, afforded a half hour of pleasure before the business of the meeting was taken up.

PRESIDENT: Before going into the regular program, in accordance with an arrangement made some months ago we will give Mr. H. W. Reding, representing the Community Fund, an opportunity to present the cause which is now in the closing days of its annual campaign.

MR. H. W. REDING gave a forceful analysis of the reasons why the Community Fund is and must be individually supported, as it receives no governmental support whatever.

PRESIDENT: Before taking up the usual order of business I wish to deviate a little from the regular program to have a few remarks from the President.

As the result of a little team work, during the last week we have had some very enthusiastic meetings of some of the Committees. In going over the lists of the Committees printed in the fore part of our Proceedings I read a lot of very fine names, but I discovered that they were not doing any work. So I proceeded to call them together and outline a program of work, and I will say to you that I never had a more enthusiastic reception in my life from any group of men than from our three important Committees. I never could accuse Mr. Forsberg of not doing any work after looking over the magnificent results produced by the Subject Committee during the past few years. Before we get through you will hear from the Chairmen of these Committees and they will tell you something of what they have in mind for the coming year. And there are a number of things I want to say myself.

In the first place I believe we must have a Club full of interest and enthusiasm. Without that it cannot amount to a great deal. That to me means a membership not only interested but participating in the meetings. We have had some difficulties with the membership in the last five years and I have heard that some do not come to the meetings through fear that they will be called upon to get up and take part in the discussions. We have agreed on a very definite program for the coming year and we will not try to force any one to get up on his feet, but we will make it so interesting that you cannot stay away.

One of the things we are trying out tonight is a little community singing before the meeting and possibly at the end. I will ask you whether or not you want to make that a fixture. I think it is a good thing to get one into the spirit of the occasion. We have provided a supply of printed song sheets, and at the conclusion of the meeting I will ask you to leave them in the seats so the Secretary will not have to get a new supply each night. We do not want to do this unless it is something the members want and we ask suggestions from the members and officers of the Club. Mr. J. Porter Gillespie has consented to head what we will call the Music Committee for the time being and he succeeded in getting a good song leader tonight. If you will put the interest and pep into it that he does we will have good singing. If you like this sort of thing we will continue it; if you do not, we will drop it. I would like an expression from the Club as to whether you think it is the thing to do.

(The expression came in the form of tremendous cheering.)

Those in favor please raise their right hand. It looks like a unanimous vote. Porter, you are engaged.

I would like to carry it a little farther. I believe there are enough in this Club with musical ability that we could have our own musical organization. Mr. Gillespie, as I have said, has consented to act as Chairman of the Music Committee, and Mr. Nagel, of the Montour Railroad, has consented to act with him on that Committee. I will ask Mr. Gillespie to stand up so that you may recognize our new Musical Director. I want every one who is interested in this and willing to participate in the musical organization to give either to Mr. Gillespie or to the Secretary information as to who you are and what you are, and also similar information as to other members of the Club who should be interested in such an organization. I thank you, Porter, for your work so far. Next meeting we will have something more to say.

So much for that. Another thing we need is a lot of new members. The Membership Committee wants a thousand paid up members by January 1st. We had 746 at our last Annual Report. They are not all paid up. We had quite a discussion about that at our recent meeting of the Executive Committee, and I will read to you the Resolution which was adopted by the Executive Committee unanimously:—

WHEREAS, owing to severe financial stress during the past several years, many of our members have not paid their annual dues and are now delinquent and subject to suspension, and

WHEREAS, these delinquent members may be lost to the Club unless some prompt action is taken;

NOW, THEREFORE, BE IT RESOLVED, that all membership dues remaining unpaid for the year 1933 and previously be cancelled and further that any now delinquent member will be restored to good standing and have his unpaid 1934 dues cancelled upon payment of 1935 dues, which are now payable, providing such member avails himself of this special privilege before the January, 1935, meeting.

That is to say we are going to get the delinquents paid up, clear up the books, and we are going after new members.

There is one point I want to mention specifically. I mentioned it before but I want to emphasize it. It has been said that some of our members do not come to the meetings for fear we will find their names on the registration cards and call on them to get up on their feet and say something. That is out. I am not going to do that. The members will please take notice and attend the meetings. We have some splendid speakers who do not like to get on their feet unless they have something to say. You can get up and say something if you have something to say, but it is terrible if you do not. What we propose is to give every member of this Club at the proper time and place an opportunity to get on his feet and say what he wants to say. But I am not going to drag you up on your feet. We will endeavor to have an understanding in advance of the meeting with some people that they will be willing to get up and discuss the paper. And I have arranged with two gentlemen to discuss the paper this evening. So you will understand that those who are called on have agreed to respond. But the door of opportunity will always be wide open to every one who has discussion to offer or a question to ask.

All those in favor of this policy will signify by raising their right hands. It looks like a unanimous approval.

I have a couple of things more. Our Reception Committee will tell you themselves in detail what they are proposing to do. I think you have seen some signs of their activities tonight. We want the Reception Committee to meet our members and visitors, see that they get acquainted and that they get something to eat at the end of the discussions. I have heard that some of you do not get anything to eat. The Reception Committee will see that nobody gets away without something to eat.

Before proceeding any further I will ask the Secretary if he has any announcements to make. Following our usual practice, we will dispense with the calling of the roll as the registration cards will afford a full record of attendance. Also, if there is no objection, we will dispense with the reading of the minutes of the last meeting, as they are in print and in the mails and will reach you probably tomorrow.

SECRETARY: Many of you will be sad to learn that since our last meeting one of our members, who was at the October meeting, has passed on, Mr. W. C. Lang, Master Car Builder, Pittsburgh & Lake Erie Railroad. He became a member of the Club October 27, 1911, and died October 26, 1934.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings.

I am going to take from the Secretary, for tonight, one of his usual jobs because I am afraid he could not hold out, that is the reading of the list of proposals for membership. These names I am about to read are all properly proposed for membership and the proposals are in each case accompanied by the annual fee of $3.00.

I almost forgot something that I consider very important. When a man is proposed for membership and his name is read out nobody knows who he is or what he looks like or whether he is bald headed or bushy headed, tall or short, and we should all know those things. So I am going to ask the new members in the future—a thing to which I referred at the last meeting of the Club—to stand up when their names are read out, so the rest of the members can see who they are, and the Reception Committee can know them, so they and we all can make you feel at home.

We have a good many new members tonight. I said we started out to get up to 1,000 paid up members by the January meeting. Tonight I will read the proposals of 169 new members. On account of the large number tonight we cannot afford the time to have them stand up and be received individually, but I will ask them to stand up as their names are called and we can welcome them in groups:

Adams, Frank W., Local Storekeeper, B. & O. R. R., 486 Ashby Street, Hays, Pittsburgh, Pa. Recommended by T. E. Britt.

Adrian, J. H., Clerk, Pennsylvania Railroad, 1931 Noblestown Road, Pittsburgh, Pa. Recommended by R. C. Miller.

Bash, J. E., District Inspector, Railroad Perishable Inspection Agency, Pennsylvania Railroad Produce Terminal, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Baumann, Edward G., Supervisor, T. & S., Pennsylvania Railroad, East Waldheim Road, Aspinwall, Pa. Recommended by G. M. Sixsmith.

Bell, W. T., Inspector of Train Service, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. C. Miller.

Bishop, H. G., Asst. Road Foreman of Engines, Pennsylvania Railroad, 5717 Howe Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Bisi, Charles W., Asst. Road Foreman of Engines, Pennsylvania Railroad, 110 Noblestown Road, Carnegie, Pa. Recommended by G. M. Sixsmith.

Bowen, C. R., Movement Director, Pennsylvania Railroad, 7 Belvedere Street, Crafton, Pittsburgh, Pa. Recommended by R. C. Miller.

Brown, C. E., Yard Master, Pennsylvania Railroad, 245 Clifton Avenue, Mingo Junction, Ohio. Recommended by G. M. Sixsmith.

Bruner, Harold L., Chief Clerk Maintenance of Way, Pennsylvania Railroad, 233 Pittsburgh Street, Springdale, Pa. Recommended by G. M. Sixsmith.

Bryant, Jess H., Station Agent, Pennsylvania Railroad, Vanderbilt, Pa. Recommended by G. M. Sixsmith.

Buhrmester, H. C., Chief Clerk—Division, Eastern Division, Pennsylvania Railroad, 3418 Clearfield Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Burke, G. C., Enginehouse Foreman, Pennsylvania Railroad, Blairsville, Pa. Recommended by G. M. Sixsmith.

Butcher, F. M., Captain of Police, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Byron, Robert J., Asst. Foreman, Pennsylvania Railroad, 4050 Cambronne Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Callahan, D. E., Asst. Division Engineer, Pennsylvania Railroad, 210 Grant Avenue, Bellevue, Pa. Recommended by R. C. Miller.

Campbell, W. T., Secretary and Treasurer, Montour Railroad Company, Oliver Building, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Carmody, J. J., Agent, Pennsylvania Railroad, 228 Chestnut Street, Kittanning, Pa. Recommended by G. M. Sixsmith.

Carrick, J. E., Asst. Yard Master, Pennsylvania Railroad, Elrama Avenue, Elrama, Pa. Recommended by W. R. Triem.

Carroll, D. C., Cashier, Pennsylvania Railroad, Eleventh and Etna Streets, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Case, H. D., Live Stock Agent, Pennsylvania Railroad, 34 Fourth Street, Aspinwall, Pa. Recommended by G. M. Sixsmith.

Cashdollar, C. J., Foreman, Pittsburgh Eleventh Street Station, Pennsylvania Railroad, 40 North Harrison Avenue, Bellevue, Pa. Recommended by G. M. Sixsmith.

Chipley, G. R., Traveling Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Clark, H. C., Supervising Agent—Division Operator, Pennsylvania Railroad, 411 Center Avenue, Verona, Pa. Recommended by G. M. Sixsmith.

Clokey, John, Yard Master, Pennsylvania Railroad, Winterton Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Clowes, W. K., Freight Agent, Pennsylvania Railroad, PRR Produce Terminal, Pittsburg, Pa. Recommended by G. Sixsmith.

Code, C. J., Division Engineer, Pennsylvania Railroad, 42 East Steuben Street, Crafton, Pa. Recommended by R. C. Miller.

Cooper, A. H., Manager, Savarins, Inc., 1618 Chateau Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Creighton, W. R., Lieutenant of Police, Pennsylvania Railroad, 213 Viola Avenue, Duquesne, Pa. Recommended by G. M. Sixsmith.

Critchfield, W. P., Supervisor Track, Pennsylvania Railroad, 287 North Walnut Street, Blairsville, Pa. Recommended by G. M. Sixsmith.

Davis, E. B., Asst. Yard Master, Pennsylvania Railroad, Brilliant, Ohio. Recommended by G. M. Sixsmith.

Day, U. G., Yard Master, Pennsylvania Railroad, 4200 Noble Street, Bellaire, Ohio. Recommended by R. C. Miller.

Denehey, Robert H., Publicity Representative, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Dickson, K. B., Manager Bureau of Equipment Inspection, Carnegie Steel Company, 227 Oakview Avenue, Edgewood, Pa. Recommended by L. H. Fry.

Dilworth, John C., Manager of Railroad Sales, Carnegie Steel Company, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Dixon, Charles P., Asst. Train Master, Pennsylvania Railroad, 156 North Spring Street, Blairsville, Pa. Recommended by G. M. Sixsmith.

Dixon, Joseph M., Asst. Yard Master, Pennsylvania Railroad, 110 California Avenue, Oakmont, Pa. Recommended by G. M. Sixsmith.

Durell, W. A., Movement Director, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Edmonston, George F., Supervisor, Labor and Wage, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Ely, J. L., Supervising Agent, Eastern Division, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Entrikin, L. F., Division Passenger Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Escott, Charles M., Clerk, Jones & Laughlin Steel Corporation, J&L Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Fair, Charles, Foreman, Car Repairs, Pennsylvania Railroad, Sixteenth Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Farlow, George B., Division Engineer, B. & O. R. R., Smithfield and Water Streets, Pittsburgh, Pa. Recommended by T. E. Britt.

Flad, E. D., Division Engineer, Pennsylvania Railroad, 52 South Balph Avenue, Bellevue, Pa. Recommended by R. C. Miller.

Flaherty, M. F., Yard Master, Pennsylvania Railroad, 145 Wilden Avenue, Steubenville, Ohio. Recommended by G. M. Sixsmith.

Flick, Samuel H., Asst. Yard Master, Pennsylvania Railroad, 429 Biddle Avenue, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Flocker, R. M., General Passenger Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Foulk, R. S., Asst. Train Master—Division Operator, Pennsylvania Railroad, 8½ Bell Avenue, Crafton, Pa. Recommended by G. M. Sixsmith.

Fox, M. C., Supervisor Track, Pennsylvania Railroad, 423 North Street, Kittanning, Pa. Recommended by G. M. Sixsmith.

Fulks, B. M., Movement Director, Pennsylvania Railroad, 428 Center Avenue, Carnegie, Pa. Recommended by R. C. Miller.

Gauvey, Fred J., Captain of Police, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Gottschalk, C. W., Asst. Traffic Manager, Jones & Laughlin Steel Corporation, Jones & Laughlin Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Gray, H. H., Division Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Gray, T. H., Master Carpenter, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Gilbert, William J., Supervisor Track, Pennsylvania Railroad, New Kensington, Pa. Recommended by G. M. Sixsmith.

Graham, Herbert J., Metallurgist, Jones & Laughlin Steel Corporation, J&L Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Gronbach, John H., District Manager, National Aluminate Corporation, 1625 Brewster Road, East Cleveland, Ohio. Recommended by E. A. Rauschart.

Hackett, S. E., President, Jones & Laughlin Steel Corporation, J&L Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Hankey, E. B., Asst. General Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Hawkins, Paul R., Asst. to President, Standard Steel Car Corporation, P. O. Box 928, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Henning, C. C., Asst. General Metallurgist, Jones & Laughlin Steel Corporation, J&L Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Henry, S. R., Supervisor Train Service, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

High, E. W., Asst. Train Master, Pennsylvania Railroad, 519 Wilkins Street, Steubenville, Ohio. Recommended by G. M. Sixsmith.

Holmes, J. R., Movement Director, Pennsylvania Railroad, 35 Schley Avenue, Ingram, Pa. Recommended by R. C. Miller.

Hook, Charles H., Asst. on Engineering Corps, Pennsylvania Railroad, 1619 Hilllsdale Avenue, Dormont, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Hornefius, S. Reed, Movement Director, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. R. Triem.

Israel, E. J., Industrial Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Jennings, A. S., General Coal Freight Agent, Pennsylvania Railroad, Pennsylvania Sta-Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Johnson, Perry, Asst. Train Master, Pennsylvania Railroad, c/o Grise Hotel, Eleventh Street, Pittsburgh. Recommended by G. M. Sixsmith.

Johnston, A. E., Asst. General Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Kane, Henry S., Freight Agent, Pennsylvania Railroad, 433 Library Avenue, Carnegie, Pa. Recommended by W. R. Triem.

Kashner, W. C., Asst. Train Master, Pennsylvania Railroad, 1041 Fourth Street, Beaver, Pa. Recommended by G. M. Sixsmith.

King, J. C., Yard Master, Pennsylvania Railroad, 2200 Nance Avenue, Wheeling, W. Va. Recommended by R. C. Miller.

Kirby, D. D., President, Kirby Transfer & Storage Company, 2538 Smallman Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Knoff, R. A., Superintendent, Labor and Wage Bureau, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Krahmer, Edward F., Supervising Agent—Division Operator, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. R. Triem.

Kuhn, Samuel H., Office Engineer, Pennsylvania Railroad, 51 Division Street, Crafton, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Leonard, J. F., Engineer Bridges and Buildings, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Lindquest, Charles J., District Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Lippold, Hermann H., Coal Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Litty, J. H., Extra Agent, Eastern Division, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Long, Alfred J., Movement Director, Pennsylvania Railroad, 1828 Pioneer Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Longstreth, W. L., Road Foreman of Engines, Pennsylvania Railroad, 301 Delaware Avenue, Oakmont, Pa. Recommended by G. M. Sixsmith.

Loucks, William V., Yard Master, Pennsylvania Railroad, 207 North Walnut Street, Blairsville, Pa. Recommended by G. M. Sixsmith.

Lowrey, J. V., Passenger Train Master, Pennsylvania Railroad, 707 Nevin Avenue, Sewickley, Pa. Recommended by G. M. Sixsmith.

Lutz, Harry, Supervisor T. & S., Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

May, J. D., Yard Master, Pennsylvania Railroad, 1410 Penn Avenue, Steubenville, Ohio. Recommended by R. C. Miller.

Mekeel, David L., Consulting Engineer, Jones & Laughlin Steel Corporation, J&L Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Mellon, Curtis B., Asst. Foreman, Pennsylvania Railroad, 124 Noll Avenue, Ingram, Pa. Recommended by G. M. Sixsmith.

Menk, C. W., Agent, Pennsylvania Railroad, New Kensington, Pa. Recommended by G. M. Sixsmith.

Meredith, A. R., Real Estate Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Merz, G. L., Asst. Foreman, Pittsburgh Eleventh Street, Pennsylvania Railroad. 500 Curtin Aveuue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Metzgar, Herbert T., Storehouse Foreman, B. & O. R. R., 5301 Gertrudes Street, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Miller, R. H., General Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Milliken, Roy C., Asst. Yard Master, Pennsylvania Railroad, Box 125 Allegheny River Building, Verona, Pa. Recommended by G. M. Sixsmith.

Mitchell, A. T., Chief Smoke Inspector, Pennsylvania Railroad, 413 McNair Street, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Mowery, George B., General Foreman, Allegheny Shops, B. & O. R. R., 101 Hazelwood Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Murray, T. J., Track Supervisor, Pennsylvania Railroad, 4014 Beechwood Boulevard, Pittsburgh, Pa. Recommended by W. R. Triem.

Myer, Charles R., Engine House Foreman, Pennsylvania Railroad, Pitcairn, Pa. Recommended by G. M. Sixsmith.

McCorkle, J. B., General Freight Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

McCormick, E. S., Train Master, Pennsylvania Railroad, 511 Sixth Street, Oakmont, Pa. Recommended by G. M. Sixsmith.

McCrossin, C. D., T. & S. Foreman, Pennsylvania Railroad, 224 Emerson Avenue, Aspinwall, Pa. Recommended by G. M. Sixsmith.

McGaughey, J. V., Asst. Road Foreman of Engines, Pennsylvania Railroad, 313 South Avenue, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

McGuirk, John J., Division Car Foreman, B. & O. R. R., 414 Moore Avenue, Knoxville, Pittsburgh, Pa. Recommended by T. E. Britt.

McHail, J. L., Agent, Pennsylvania Railroad, 311 Ninth Avenue, Homestead, Pa. Recommended by W. R. Triem.

McKalip, W. B., Agent, Pennsylvania Railroad, Tarentum, Pa. Recommended by G. M. Sixsmith.

McNary, Frank R., Movement Supervisor, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

McNeal, A. R., Asst. Foreman, Pittsburgh Eleventh Street Pennsylvania Railroad, West Railroad Street, Heidelberg, Pa. Recommended by G. M. Sixsmith.

Nestor, T. E. Division Engineer, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. R. Triem.

Niklaus, C. G., Head Clerk, Pennsylvania Railroad, 1600 Evergreen Avenue, Millvale, Pa. Recommended by G. M. Sixsmith.

Overholt, Bruce C., Tel. & Sig. Foreman, Pennsylvania Railroad, 205 Buffalo Street, Freeport, Pa. Recommended by G. M. Sixsmith.

Peebles, A. T., Chief Clerk, P. R. R. Produce Terminal, Pennsylvania Railroad, 332 Ridge Avenue, New Kensington, Pa. Recommended by G. M. Sixsmith.

Peel, Joseph E., Jr., Movement Director, Pennsylvania Railroad, 81 Evans Avenue, Ingram, Pa. Recommended by G. M. Sixsmith.

Phillips, W. A., Asst. General Passenger Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Phillips, William E., President, Pittsburgh Branch, The Multi Stamp Company, 381 Freeport Road, Blawnox, Pa. Recommended by G. M. Sixsmith.

Pollock, A. C., District Sales Manager, Jones & Laughlin Steel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Pry, E. B., Superintendent, Tel. & Signals, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Rebstock, J. B., Chief Clerk—Division, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. R. Triem.

Reed, E. S., Superintendent, Passenger Transportation, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Reno, D. A., Yard Master, Pennsylvania Railroad, 3011 Zephyr Avenue, Corliss Station, Pittsburgh, Pa. Recommended by R. C. Miller.

Richardson, Fred, Freight Representative, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Robinson, Lester L., District Motive Power Inspector, B. & O. R. R., 1521 Orangewood Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Rodkey, C. C., Captain of Police, Pennsylvania Railroad, 3001 Graham Boulevard, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Ross, C. R., Supervisor Regional Expenditures, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Rowley, C. R., Agent, Pennsylvania Railroad, Verona, Pa. Recommended by G. M. Sixsmith.

Ryan, James M., Clerk, Pennsylvania Railroad, 135 Fourth Street, Aspinwall, Pa. Recommended by R. C. Miller.

Seltman, O. W., Asst. Cashier, Pennsylvania Railroad, Eleventh and Etna Streets, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Sersch, J. G., Superintendent of Police, Pennsylvania Railroad, 3 Eastern Avenue, Aspinwall, Pa. Recommended by G. M. Sixsmith.

Shackelford, L. P., Asst. Yard Master, Pennsylvania Railroad, 3305 Main Street, Homestead Park, Pa. Recommended by W. R. Triem.

Shank, S. L., District Passenger Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Sharpless, G. G., Manager, Pittsburgh Joint Stock Yards Company, Herrs Island, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Shingledecker, John C., Supervisor of Service Stations, The Pennzoil Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Shultz, Leo W., Clerk, Pennsylvania Railroad, 836 Florence Avenue. Avalon, Pa. Recommended by G. M. Sixsmith.

Shumaker, John W., Captain of Police, Pennsylvania Railroad, 1401 Jeffers Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Shuman, Forrest R., Movement Director, Pennsylvania Railroad, 5503 Center Avenue, Pittsburgh, Pa. Recommended by J. G. Dennis.

Simpkins, Fred E., Freight Movement Director, Pennsylvania Railroad, 915 Ross Avenue, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Skiles, E. H., Agent, Pennsylvania Railroad, 124 Second Street, Aspinwall, Pa. Recommended by G. M. Sixsmith.

Slagle, Charles E., Foreman. Produce Yard, Pennsylvania Railroad, 114 View Street, Oakmont, Pa. Recommended by G. M. Sixsmith.

Smith, G. C., Asst. Yard Master, Pennsylvania Railroad, 412 Eleventh Street, Oakmont, Pa. Recommended by G. M. Sixsmith.

Snyder, Jesse L., General Yard Master, Pennsylvania Railroad, 216 North Linden Avenue, Pittsburgh, Pa. Recommended by R. C. Miller.

Spencer, Albert C., Supervisor Train Service, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Stackhouse, Paul T., Vice-President, Pennsylvania Transfer Company, 1013 Penn Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Steding, Henry L., Special Duty Engineman, Pennsylvania Railroad, 1952 Lowrie Street, N. S., Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Stevenson, R. F., Chief Clerk, Pittsburgh Eleventh Street, Pennsylvania Railroad, 365 College Avenue, Oakmont, Pa. Recommended by G. M. Sixsmith.

Stratford, C. T., Supervisor Track, Pennsylvania Railroad, 222 Emerson Avenue, Aspinwall, Pa. Recommended by G. M. Sixsmith.

Suffern, R. J., Asst. Road Foreman of Engines, Pennsylvania Railroad, 3500 Allendale Street, Corliss Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Taylor, Harry D., Lieutenant of Police, Pennsylvania Railroad, 533 Avery Street, N. S., Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Ternet, Harry J., Section Stockman, B. & O. R. R., 840 North Avenue, North Braddock, Pa. Recommended by T. E. Britt.

Teufel, W. O., Master Mechanic, Pennsylvania Railroad, Pitcairn Shops, Pitcairn, Pa. Recommended by G. M. Sixsmith.

Thompson, Harris, Service Engineer, National Aluminate Corporation, 213 Castle Shannon Road, Mt. Lebanon, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Todd, William B., General Manager of Sales, Jones & Laughlin Steel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Tracey, J. B. A., Chief Clerk—Division, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Turner, A. L., Extra Agent, Pennsylvania Railroad, 334 School Street, Springdale, Pa. Recommended by G. M. Sixsmith.

Vowinkel, Fred F., Salesman, Jones & Laughlin Steel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Walsh, J. J., Special Agent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Walter, E. R., Movement Director, Pennsylvania Railroad, 1504 Foliage Street, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Walton, W. K., Chief Clerk, Coal Freight Traffic Department, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Webster, R. L., Agent, Fruit Growers Express Company, 21st and Pike Streets, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Weldon, Dewey, Asst. Train Master, Pennsylvania Railroad, 414 East End Avenue, Beaver, Pa. Recommended by R. C. Miller.

Weygandt, J. H., Asst. Yard Master, Pennsylvania Railroad, 313 Anton Street, Monongahela, Pa. Recommended by W. R. Triem.

Whitehouse, E. L., Station Agent, Pennsylvania Railroad, Ford City, Pa. Recommended by G. M. Sixsmith.

Williams, J., Yard Master, Pennsylvania Railroad, Fifth Street, West Elizabeth, Pa. Recommended by W. R. Triem.

Williams, O. J., Movement Supervisor, Pennsylvania Railroad, 816 Try Street, East End, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Wilson, W. S., Division Engineer, Conemaugh Division, Pennsylvania Railroad, 233 Dalzell Avenue, Ben Avon, Pa. Recommended by G. M. Sixsmith.

Wilson, James R., Draftsman, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. H. Flinn.

Wisegarver, F. H., Train Master, Pennsylvania Railroad, 63 Bedford Avenue, Crafton, Pittsburgh, Pa. Recommended by R. C. Miller.

Wolcott, L. M., Asst. Train Master, Pennsylvania Railroad, 125 Euclid Avenue, Elm Grove, Wheeling, W. Va. Recommended by R. C. Miller.

Young, J., Jr., Engine House Foreman, Pennsylvania Railroad, 4073 Cambronne Street, N. S., Pittsburgh, Pa. Recommended by G. M. Sixsmith.

You may be interested to know that of these 169 new members 145 are from the Pennsylvania Railroad, 24 from other roads—and that shows what the other railroads could do if they got busy like the Pennsylvania. When I looked over the list of the Membership Committee I noticed that there was no Pennsylvania Railroad man on it. You may have noticed that the name of Mr. Sixsmith appeared quite frequently as a recommender in the list of new members which I read to you. He was not a member of the Membership Committee but I made him a member *pro tem.* and as I am his boss and I tell him what to do and he has to do it, I told him to get busy—and did he do it!

I said that the Reception Committee is going to have plenty of work to do. I have got a new name for the Reception Committee, more in keeping with its broader function. It will be known as the Reception and Attendance Committee and we expect them to come to the meetings and greet the members who come and get the others to come out. It looks as if some one had been busy on that job tonight, for this is the best attendance we have had for a long time outside of the Annual Meeting and I am not so sure that we are not ahead of the attendance at the Annual Meeting. I said Mr. Sixsmith has been busy. He has, and I am going to call on him to make a few remarks to defend himself, and also to explain what more he has in mind to do. He has done a lot of work in this Railway Club and I think he has had as much fun out of it as you fellows have.

Right here, the Secretary tells me we have an attendance here tonight of 354, 236 members and 118 guests.

I will now ask the Chairman of the Reception and Attendance Committee, Mr. G. M. Sixsmith, to tell you something of his plans and to introduce to you the other members of his Committee so you will know who they are, so you may know something of what is going to happen in the Club in the near future.

MR. G. M. SIXSMITH: I was afraid something like this was going to happen. Mr. President, Members of the Railway Club of Pittsburgh and Visitors—and by the way, as a member of the Reception Committee I want to amplify, if I can, what Mr. Flinn has said with respect to visitors. In the future, or commencing at once for that matter, we want to endeavor to make our visitors feel that they are welcome here, make them comfortable, and, if possible, induce them to become members. I do not want to assume to speak for the Membership Committee, and we are not trying to coerce anybody to join the Club, but if their experience with us as our guests is what it should be, I have no doubt some of these visitors, from time to time, will want to join of their own free will and for what they can get out of the Club as members.

I appreciate, I assure you, the courtesy of recognition on this eventful occasion. I say eventful because, by the enthusiasm that prevails here tonight not only by the large attendance but by other indications as well, we are entering upon one of the most interesting seasons in the history of this Club. By reason of my close association with the new President, both personally and officially, I have had an opportunity to know what has been going on behind the scenes in connection with this Club during the last week or two, and I am sure that the plans under preparation will be met with the approval of the entire membership, which prompts me to make the prediction that I have just made. And in saying that, I do not want to appear to be thinking, let alone speaking, in a manner that might be considered a reflection on the activities of any of the past officers of the Club. I know they have all been busy and have done their utmost to promote interest within the Club, but from the way this new President is starting out, I am sure that if hard work will make his administration a success, it is already an assured success. I have been a member of the Club and have served on Committees for some years, and have never before been called upon to attend any meetings, but this gentleman to whom I refer has had me in meetings a half a dozen times during the past week, had laid down a policy for the various Committees to follow, and all of this indicates conclusively to me that we are going somewhere this winter in this Club.

Now, gentlemen, I am not susceptible to embarrassing moments, but I want to assure you that I am in the throes of one right now. That there may be no misunderstanding, and in order that all of you may know that I am not traveling under false colors, I want to make it absolutely clear that I had plenty of help in connection with securing the new members whose names were read here tonight by the President. These new members were not secured so much by my personal effort as by the efforts and assistance of many of my associates and friends, and they in their courtesy to me rendered valuable assistance in making the enrollment of new members as large as it is. I also want to make it clear to any who may be in doubt that the persons whose names were read here as new members are coming into this Club because they want to, that not a man approached for membership, and whose membership was obtained, was in any way coerced into joining. These men are joining, I should say, for two distinct reasons. First, everyone of these men is personally acquained with Mr. Flinn and has a natural desire to extend to him full support and assistance in his administration as President of this Club. Many of them, I am sure, will continue as members after the present administration's term of office has expired. The second reason that occurs to me is that they have a real desire to be a member of a club of this kind. In some cases, some of the men approached for membership expressed themselves as having desired to be members for some time and were not sure that they were eligible, and others, not previously approached, voluntarily requested that their names be proposed and sent me their applications together with their dues for the first year. You can therefore readily see that the job of securing so many new members did not entail the personal effort that it appears to have.

One of the outstanding selling points in interesting a person in joining the Club is the question of the free lunch. I told them that a membership cost $3.00 a year and in addition to enjoying a pleasant evening on the occasion of our meeting nights, they received $10.00 worth of free food.

SECRETARY: $11.00, to be accurate.

MR. SIXSMITH: And nobody knows what would happen if we had free beer. I hope none of my friends on The Pennsylvania Railroad, or elsewhere so far as that is concerned, will feel slighted if they have not been approached for membership in this Club. I can only ask those gentlemen to be patient, because as time goes on they will be thought of and have their opportunity.

Now Mr. Flinn has asked me to say something about the Reception Committee. He wants not only the Reception Committee but all of the Committees of this Club to be active, and we are going to be active. He has added to the duties of our Committee the additional feature of bringing out the attendance to the extent that this can be accomplished, and he has also asked that the Reception Committee give some supervision over the lunch feature on meeting nights. We are going to police the lunch and do the best we can to have everything properly arranged and plenty to eat, but the Secretary will still have the job of making the preliminary arrangements.

Here is something that will surprise the membership, and I am sure will be a shock to the other members of the Reception Committee. The members of the Reception Committee from now on will be required to wear a badge with their names prominently displayed, and if any of you gentlemen do not become acquainted with the Reception Committee under those conditions, it is your own fault. I would ask the members not acquainted with us to make themselves known and give us an opportunity to get better acquainted and introduce you to other members of the Club. It can readily be seen, therefore, that one of the outstanding ideas that Mr. Flinn has in mind is the promotion of greater sociability, better acquaintanceship among the members, and a general good time had by all on meeting nights, and in order that we may move further along the line of progress in that direction tonight, I am going to ask each member of the Reception Committee who is in the room to stand up that all of you, and especially the new members just coming in, may get better acquainted quickly and know who is who.

(The Chairman of the Committee then introduced each member of the Committee, with an appropriate comment as to his position and activities.)

Now with respect to the visitors, the thought is, as I have previously indicated, to have our visitors feel comfortable and enjoy their evening with us, and to the extent that it is possible for the Reception Committee to do so, the various members will circulate around before and after the regular meeting and do what they can to promote better acquaintanceship and greater sociability among us.

And now, Mr. President, I want to pledge to you and the other executive officers of the Club, my wholehearted support as Chairman of the Reception Committee during the coming year. I believe I can properly include in that pledge the other members of the Reception Committee, and, indeed, I think that I will be speaking for all if I add that as the sentiment of the entire membership of the Club.

PRESIDENT: I thank you, Mr. Sixsmith. We have been getting along pretty well and we will be ready for the speakers in just a few moments. I want first to have a few remarks from the Chairman of the Membership Committee, Mr. Herbert J. Watt.

MR. HERBERT J. WATT: Instead of a Report for the Membership Committee, I bring you fair and friendly warning against this man Rufus Flinn. If he comes to you in his Presidency to do something for this Club, you will save yourself time and energy if you give in immediately. The technique of the man embraces among other things his own great enthusiasm and a friendly capacity to swarm all over his victim—for the good of the Club. As an example, I was told something short of a week ago that I was Chairman of this Committee, and in that brief span the aggregate of telephone calls, letters and meetings has been staggering and left no time to compose my mind on what might be reported to you tonight. However, you have heard the Committee in substance from the speakers ahead of me, which is all that is needed, except to emphasize a suggestion by Mr. Flinn that each member of the Club undertake to bring in one new member. The idea is not members for the sake of mere numbers. It is that the more we can find who are interested in what the Club has to offer, the better the Club, the more we are sharing with, and the better position we are in to command programs not otherwise available.

The Club has a good deal to offer in its proceedings and in the association here. No one would attempt to measure the value of the Club in terms of dollars, but it would be difficult to find so much for $3 a year anywhere else.

It is growing late; we shall therefore, reserve for another time some things that might be said, adding only that in the membership as it stood before the 169 new names of tonight, we had 746. Of this number, 23 railroads account for 343, Industry and all other sources, 403.

(The speaker then introduced the members of the Membership Committee.)

PRESIDENT: We thank you, Mr. Watt. We are reaching a point where we are holding our speakers out of their rightful dues, but if they will bear with us a few moments more we will get to the real work of the evening. I will ask Mr. Forsberg, Chairman of the Subject Committee, to say a word. I take this opportunity to pay him a tribute as Chairman of the Subject Committee which is richly deserved.

MR. R. P. FORSBERG: Mr. Chairman and Gentlemen: I am very deeply appreciative of the remarks of our honored President relative to the work that has been done by the Subject Committee of our Club during the past year. If our efforts have met with any degree of success in the past and we make a satisfactory record in the approaching year, it will be because we have kept our noses close to the grindstone. Some one has said:

> If your nose is close
> To the grindstone rough,
> And you hold it down
> There long enough,
> In time you'll say
> There's no such thing
> As brooks that babble
> And birds that sing.
> These three will all
> Your world compose,
> Just you, the stone and
> Your d—ed old nose.

Thank you. Subject Committee signing off.

PRESIDENT: Thank you, Mr. Forsberg. We will cut short the formal business of the evening and go immediately to the paper of the evening. We have with us tonight Mr. George S. Schramm and Mr. R. F. Johnston, of the American Sheet & Tin Plate Co., of Pittsburgh, who will present a paper on the subject "High Tensile Corrosion Resisting Steel for Railroad Equipment." Gentlemen, the floor is yours.

Cor-Ten—A High Tensile Corrosion Resisting Steel for Railroad Equipment

By R. F. Johnston[1] and G. N. Schramm[2]

The recent interest and efforts on the part of the railroads and other mobile equipment users to reduce the weight of equipment in order to effect needed economeis in operating and maintenance costs have resulted in the demand for construction materials not heretofore available. The requisites of such a material are, (1) it must be considerably stronger than the mild open hearth steel now used, (2) it must have sufficient ductility and workability to be fabricated into the variety of parts required, (3) it must have an increased resistance to corrosion in order to have a useful life in the thinner sections equal to or better than the life of the mild open hearth steel in the thicker sections and (4), and most important, it must also be available at a price which will not materially increase the cost of the completed structure.

To meet this demand the alloy steel which is to be described below was developed on a commercial basis by the research metallurgists of the United States Steel Corporation. This steel, designated "USS COR-TEN", meaning high corrosion resistance —high tensile strength, is now produced commercially in the various products of the subsidiary companies of the United States Steel Corporation.

MECHANICAL AND FABRICATING PROPERTIES

Table I shows the approximate chemical and physical properties of this steel. The ranges which are shown for the physical properties are the minimum values to be obtained on sheets and strip. The exact minimum values may vary according to the required heat treatment but will be within the ranges given.

Regular open hearth steel is included for purposes of comparison only. Two other high tensile steels, designated "USS MAN-TEN" and "USS SIL-TEN", are also shown. The following discussion will be confined principally to the USS COR-TEN grade, but it might be mentioned that the USS MAN-TEN steel is a medium manganese—carbon steel, similar to that which has been extensively used for a number of years, while USS SIL-

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(1) Operating Department, American Sheet and Tin Plate Company, Pittsburgh, Pa.

(2) Corrosion Research Laboratory, American Sheet and Tin Plate Company, Pittsburgh, Pa.

TABLE I

CHEMICAL AND PHYSICAL PROPERTIES

Composition and Properties		Regular Open Hearth	USS Cor-Ten	USS Man-Ten	USS Sil-Ten
Carbon	% (1)	0.10	0.10	0.35	0.40
Manganese	%	0.50	0.10 to 0.30	1.25 to 1.70	0.70 to 0.90
Phosphorus	%	0.04	0.10 to 0.20	0.04	0.04
Sulphur	%	0.05	0.05	0.05	0.05
Silicon	%	0.10	0.50 to 1.00	0.15 Min.	0.20 to 0.30
Copper	%	0.20(2)	0.30 to 0.50	0.20(2)	....
Chromium	%	....	0.50 to 1.50	....	....
CORROSION RESISTANCE (ATMOSPHERIC, COMPARATIVE)		1 (or 2 to 3 Cu)	4 to 6	1 (or 2 to 3 Cu)	1 (or 2 to 3 Cu)
Yield Point (lb./sq. in.)		25-35,000	50-60,000	55-65,000	45,000
Tensile Strength do		35-50,000	65-75,000	80-90,000	80-95,000
Elongation (% in 2 in.)		34-25	27-22	25-20	23-18
Impact Izod (ft. lb.)		30	60	40	....
Endurance Limit (lb./sq. in.)		25,000	45,000	40,000	....
Density (lb./cu. in.)		0.283	0.283	0.283	....

Modulus of elasticity—28 to 30,000,000.
Reduction in area is not considered for sheets.
Impact and endurance values are only approximate and have not been determined for sheets.

(1)—Maximum—If no range or other limit indicated.
(2)—Minimum—If copper specified.

TEN is structural silicon steel. These two steels are also available with copper, in which case their atmospheric corrosion resistance is approximately the same as copper bearing mild steel. Due to the increased carbon and manganese content of these two steels, their strength may approximate, or in the case of MAN-TEN even exceed, that of COR-TEN. However, their ductility is somewhat less, indicating that they cannot be cold formed to the same extent as COR-TEN. It is obvious, therefore, that these steels will find their major application where the better forming qualities and increased corrosion resistance of the COR-TEN grade are not required.

Referring to the COR-TEN grade it will be noted that the important alloying elements are chromium, copper, phosphorus and silicon. These four elements have been carefully adjusted to give the best combination of strength, workability, and corrosion resistance. The low carbon content improves the ductility.

The higher physical properties of USS COR-TEN steel as compared with those of low carbon steel allow considerably higher working stresses to be used and consequently by proper design noteworthy reductions in weight are possible. In many cases a value of 25,000 pounds per square inch for combined stresses has been used which compares with a value of 16,000 pounds per square inch for regular carbon steel. Actual loading tests made on car parts fabricated from COR-TEN and regular steel confirm these figures. The elastic limits of the tested sections, as obtained by the J. B. Johnston method, were almost exactly in the same ratio as the above mentioned working stresses.

HOT PRESSING.—One of the outstanding advantages of USS COR-TEN is that it is essentially a non-hardening steel; its excellent physical properties are derived from the alloying elements. Physical properties of car diaphragms before and after hot pressing indicate that rapid cooling from temperatures normally used in fabricating does not produce appreciable hardening. This is because the upper thermal critical point of this steel is approximately 1850 deg. F., a temperature practically never reached in ordinary fabricating processes. The values obtained also indicate that there is no need of any heat treatment on COR-TEN after hot pressing. Cold working develops a slightly increased hardness with correspondingly higher yield point and decreased ductility, very similar to the effects obtained in mild steel.

COLD FORMING.—Right angle and flat bends can be made satisfactorily in the COR-TEN steel. It is generally good practice to increase the radii of bends slightly, to the amount of one thickness of material in thin sections and two thicknesses in the heavier sections. This is also good practice even in mild steel, particularly in the thicker sections, in order to reduce extreme outside fibre stresses. Spring-back is slight in the case of bends over small radii while it may be as much as 25% in the case of bends over larger radii. Since COR-TEN steel has a much higher yield point and tensile strength than does mild steel, it is natural to expect that greater forces will be required to produce deformation. However, since the thickness of sections is usually reduced equivalent to the greater strength available in COR-TEN steel it is frequently found that no extensive changes are required in shop equipment.

Punching and reaming tests have been made on COR-TEN steel with results comparable with the expected values resulting from the different characteristics of this steel. Power readings indicate that COR-TEN steel requires about 25% more power than mild steel for punching. Reaming tests indicate that less power is required in reaming COR-TEN steel than that required for mild steel.

RIVETS AND BOLTS.—Rivets can be made readily of COR-TEN steel. Smaller than ½″ diameter may be driven cold, while ½″ diameter and larger sizes may be driven hot. The deformation and flow of the metal are good and the hole is tightly filled. In double shear tests, unit shear values between 55,000 and 60,000 pounds per square inch were obtained.

Results with bolt forgings indicate that the metal is slightly tougher for threading than regular steel. A little study may be necessary to determine the proper speed and die shape so as to eliminate any tearing tendency. Tension tests of a forged head gave a yield stress of 64,000 pounds per square inch based on shank area. The breaking load was 73,000 pounds per square inch based on the bolt diameter or 109,000 pounds per square inch based on the area at the root of the thread. The proper value would be somewhere between these two figures.

WELDING.—This steel is readily welded by any of the usual methods and there is no air hardening effect adjacent to the weld. For nearly all applications any of the regular high speed electrodes are entirely satisfactory. For extremely corrosive conditions a coated COR-TEN electrode is available. Tension tests on ⅜″ plate welded with 3/16″ COR-TEN coated electrodes indicates tensile strengths of approximately 75,000 pounds per square inch with elongations of 25% in ½″ and 17% in 2″. Miller bend tests indicated elongations about 40% in ½″ and 20% in 2″. These values compare favorably with those obtained with commercial coated electrodes.

IMPACT AND ENDURANCE VALUES.—These characteristics of a structural material are of great importance in mobile equipment which is subjected to repeated shocks and impact stresses. Izod impact values of COR-TEN steel at various temperatures indicate a marked superiority over carbon steel. The values at low temperatures are appreciably better and are of considerable interest in consideration of equipment destined for use in localities where sub-zero temperatures are often attained.

It will be recalled that the endurance value for this steel shown in Table I was 45,000 pounds per square inch as compared with 25,000 pounds per square inch for mild steel. The high ratio of the endurance limit to the tensile strength, which is 0.60 to 0.65, is noteworthy.

AVAILABLE FORMS.—USS COR-TEN steel is available in shapes, plates, bars, strip, sheet, light plates, rods, wire and wire products, pipe and tubular products. The new ARA Z-bar section for center sills has been rolled with the web reduced from the usual 13/32″ to 5/16″.

CORROSION RESISTANCE

In the midst of the enthusiasm about new steels designed for light weight trains, one is apt to minimize the amount of research necessary in the development of these materials. The study of the corrosion resistance of hundreds of steels, for example, led to the production of USS COR-TEN. It need not be said, therefore, that the acquisition of corrosion data is always an uninteresting and fruitless endeavor. Those who have searched for new materials of construction are usually flattered by the wide acceptance of a particular product, yet, frequently, that very acceptance was the incentive back of the search.

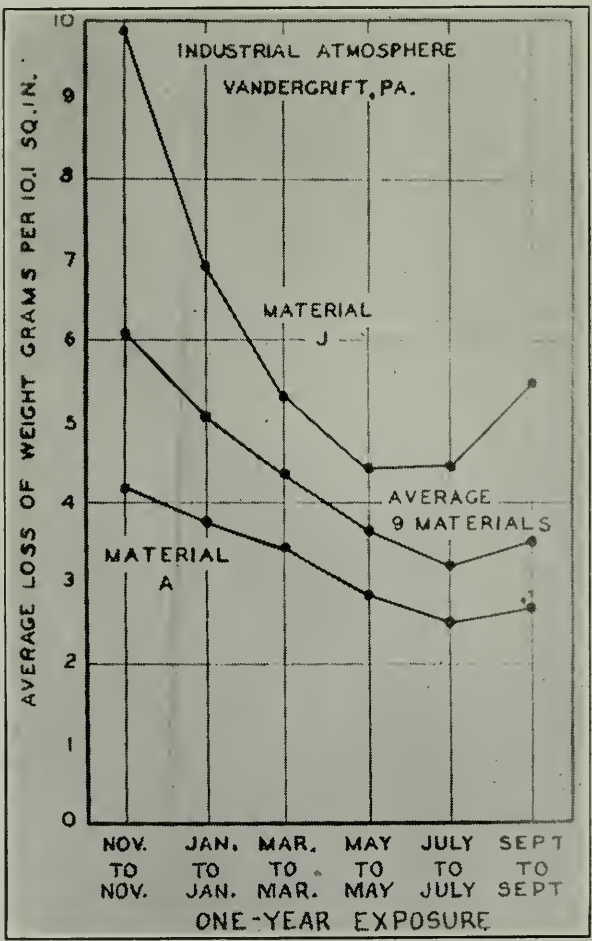

FIGURE 1.—The season of the year during which an atmospheric corrosion test is started exerts an important influence on the rate of corrosion.

Corrosion testing is not always productive. It must consist of more than placing one or two haphazard samples on the roof or on the window sill until something happens. When it is desired to evaluate a material with respect to its ability to withstand the influences which tend to destroy it, that evaluation must be based upon a comparative study of several materials when exposed to similar conditions. It may be misleading to say that one steel is better than another when the two steels have not been compared directly under identical conditions. It is necessary that the manufacturing treatment of the two steels be approximately the same, that surface conditions such as smoothness and cleanliness be the same, that the samples be exposed at the same time to the same corrosive conditions for the same period of time and that each material receive exactly the same treatment throughout the test. Furthermore, quantitative data of real value may be obtained by weighing the test pieces before and after the test. The use of corrosion data so obtained also calls for serious consideration. Figure 1 illustrates some of the precautions which have been mentioned.

The graph has been taken from the work of Schramm and Taylerson([1]) presented at the March meeting of the American Society for Testing Materials. Samples of seven different sheet steels were exposed to an industrial atmosphere for a period of one year. At intervals of two months after the test was started identical sets of samples were initially exposed and allowed to remain on the racks for a year. It will be seen that the time of the year in which the test was started exerted an important influence on the amount of corrosion. It is obvious that if a sample of steel "A" only had been initially exposed in November and one of steel "J" started in May, steel "J", which appears to be as good as the other, might have been selected for use. Some of these same data, plotted in a different manner, are shown in Figure 2.

There was no direct relationship between the amount of rainfall and the amount of corrosion, but there seemed to be a somewhat definite relationship between the amount of corrosion and the degree of pollution of the industrial atmosphere.

It may be of some interest to know that more than 30,000 samples have been tested in the last six years. This number comprises about 850 different steels and protective coatings in about 145 different laboratory and field tests.

The amount of corrosion is usually determined by the loss of weight of samples exposed for a given time, the final weight being obtained after the rusted samples are cleaned electrolytically. In some cases they are graded according to the time required for corrosion to perforate sheets but visual observation of rusted materials may result in misleading conclusions.

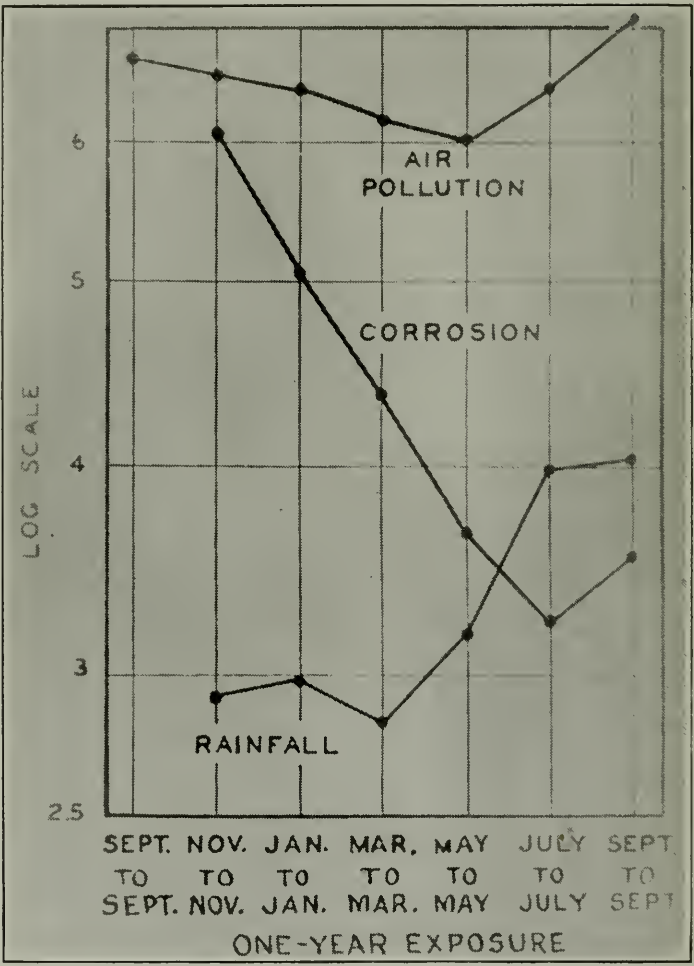

FIGURE 2.—There is some indication that the amount of corrosion of steel in an industrial atmosphere is some function of the amount of atmospheric pollution. No definite relationship appears to exist between the amount of corrosion and the amount of rainfall.

The corrosion work of the American Sheet and Tin Plate Company has, as a background, the successful development of copper bearing steel. The effect of copper in iron had been studied by Stodart and Faraday(2) as early as 1822, but it was not until 1913 that D. M. Buck (3), following the work of Burgess and Aston[4] in 1910, pointed out the influence of small amounts of copper on the corrosion resistance of steel. Subsequent intensive investigational work by Buck was responsible for rapid progress in the manufacture and successful applications of copper bearing steel, or more simply, copper steel. Within several years of his original work copper steel was being used extensively, and in 1920 the engineers of one of the eastern railroads adopted copper steel as the standard material for the construction of open cars, passenger cars, and box cars. The value of copper bearing steel is now recognized throughout the world—its adoption resting almost solely on the fact that the steel is more resistant to atmospheric corrosion than plain irons and steels.

In connection with tests of the weathering of materials, the railroad materials engineer should be particularly interested in the work of the American Society for Testing Materials and the Corrosion Committee of the British Iron and Steel Institute. Recent papers by Hocker, Passano, Schramm and Taylerson, Finkeldey, and Hippensteel[5] and by Kendall and Taylerson[6] discuss some of the interesting results obtained to date by the American Society for Testing Materials on bare and coated ferrous sheets, shapes and hardware, and on non-ferrous metals and alloys. The British Iron and Steel Institute has made two reports[7]. Many private organizations have conducted comprehensive tests, the reports of which may be found in the technical literature.

THE CORROSION RESISTANCE OF USS COR-TEN.—Sheet samples of USS COR-TEN and other steels which have been exposed to industrial atmospheres for several years show that this steel will last from four to six times as long as good plain steel. The relative value of a material depends upon the known value of the standard material with which it is compared, but if the standard is variable in quality, the relative value of the material under test may remain unknown. It will be noted, however, that COR-TEN has been compared with plain steel of known quality; the advantage of COR-TEN over certain other plain irons and steels is even greater than has been stated. Figure 3 shows some of the corrosion data graphically. The comparative value of COR-TEN, copper steel and a good plain steel may be seen. The relative value of two other widely used plain steels are given in the curves, and the superiority of COR-TEN is strikingly demonstrated.

The units in which corrosion has been expressed are those in which the amount of corrosion was determined, but they may be converted into average depths of penetration or any other units without altering the relative values of the different steels. It will be seen that the relationship between the amount of corrosion of any steel and time is not linear; that is, the rate of corrosion is not constant([8]). The rust film on steel, therefore, is protective in character. This relationship has been verified by studies of the curves of hundreds of different ferrous materials.

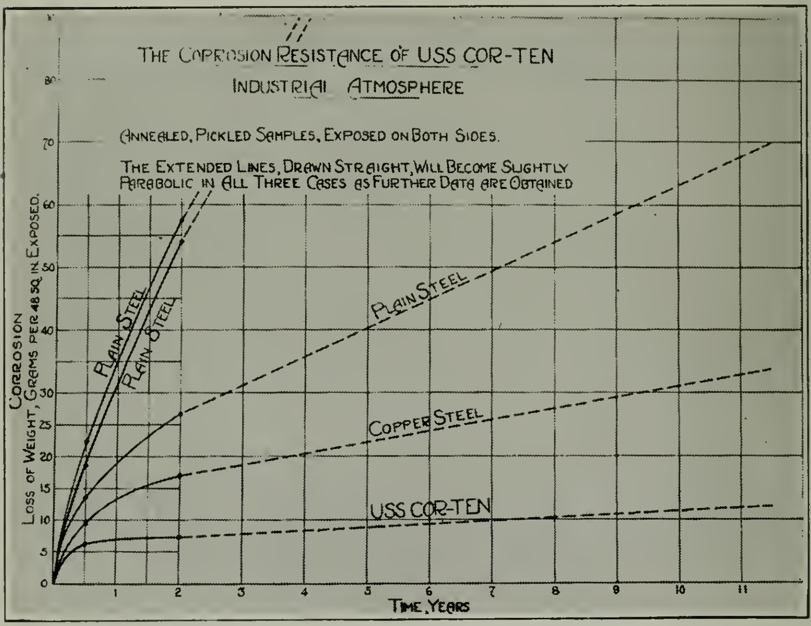

FIGURE 3.—USS COR-TEN is about five times as resistant to severe industrial atmosphere as a good plain steel, and many times as resistant as certain plain irons and steels in wide use.

The shape of the curve in the figure shows that the life of a structure cannot be determined from a single set of corrosion observations. The steel in the structure or samples of the steel must be observed from time to time in order to arrive at the shape of the curve representing the speed of deterioration. The designing engineer may then calculate the expected period of usefulness of the structure.

USS COR-TEN is characterized by a slow, rapidly decreasing rate of corrosion in the atmosphere. A smooth, evenly corroded surface results, the advantage of which is obvious. The coating that forms is harder, denser, and more adherent than that which forms on ordinary steel, and severe abrasive action is necessary to remove it. The photograph in Figure 4 shows the extent and character of the oxide which forms on USS COR-TEN, copper steel, and plain steel after three years in a severe industrial atmosphere.

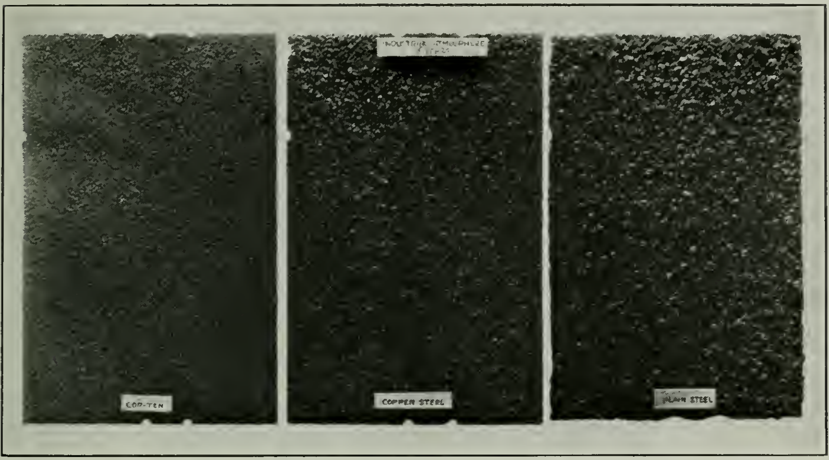

FIGURE 4.—Typical samples of uncleaned USS COR-TEN, copper steel, and plain steel after exposure to an industrial atmosphere for three years. The oxide on COR-TEN is dense, hard, and unusually adherent. The notches in the edges are identifying marks.

The durability of USS COR-TEN under the combined atmospheric and brine spray conditions which may exist in and around refrigerator cars, icing stations and right-of-way equipment, emphasizes the resistance of this material to severe corrosive influences. Samples of many steels were compared by exposing sheets to an industrial atmosphere at an angle of five degrees from horizontal and spraying them twice weekly with a 10% salt solution. The samples were sprayed on both sides only long enough to thoroughly wet them, the test being continued for a period of three months. USS COR-TEN, under these conditions, is twice as durable as copper steel and almost three times as good as open hearth iron and steel. The rust on all of the regular steels was in the form of large, loose patches, the removal of which revealed deep pits and holes, but that which formed on COR-TEN was much smoother and the sound steel was corroded much more uniformly.

Recognizing that one of the most important corrosion problems of the railroads involves the durability of open top cars, particular attention has been directed to the factors which may cause rapid deterioration of this equipment and to the manner in which USS COR-TEN may be applied. Obviously it is not possible at present to point to long time railroad installations of this steel and it is seldom justifiable to substitute accelerated tests for service tests which involve the element of time. Consequently it is impossible to state definitely how good a particular material will be after twenty-five years of service.

Without the element of time, and lacking long time service applications, the most expedient way to test a steel is to subject it to the nearest natural corrosive conditions to those which exist in service. Since the water which filters through coal in a coal mine is similar to that which filters through coal in a coal car, samples of many steels were immersed in the running acid water of an underground stream in order to determine the relative durability of COR-TEN. After four months' immersion this steel was found to be more than twice as resistant as copper steel and about three times better than plain steel. Figure 5 is a photograph of several of the test pieces . COR-TEN is the only known low alloy steel which becomes covered with a smooth, adherent coating in mine water, or in ordinary water, and corrodes in a uniform manner without the formation of deep pits or furrows.

The durability of steel hopper cars depends to a very considerable extent on the corrosive conditions to which the car is subjected over a period of years. Close inspection of many corroded cars and careful studies of the facts obtained show, however, that the destruction of the cars is not due to corrosion by coal, as has been generally assumed to be the case, but that from 70 to 90% of the corrosion results from exposure to atmospheric conditions. We are convinced, therefore, that too much emphasis has been placed on the effect of coal on steel cars in normal coal service. All of us know of cases where cars have been seriously corroded after coal had been stored in them for six months or a year. The very fact that some of these cases have been recounted on several occasions demonstrates the unusualness of the phenomenon, but the most striking proof that these are unusual cases rests on the fact that the hundreds of thousands of cars in normal service were not affected by severe corrosion in a short time. While these troublesome cases can be, and should be, eliminated, the measures of the durability of all cars must not be based on what happens to a few neglected cars. Simply because a few cars have been destroyed by coal corrosion, it must not be concluded that all cars must be destroyed by the same process.

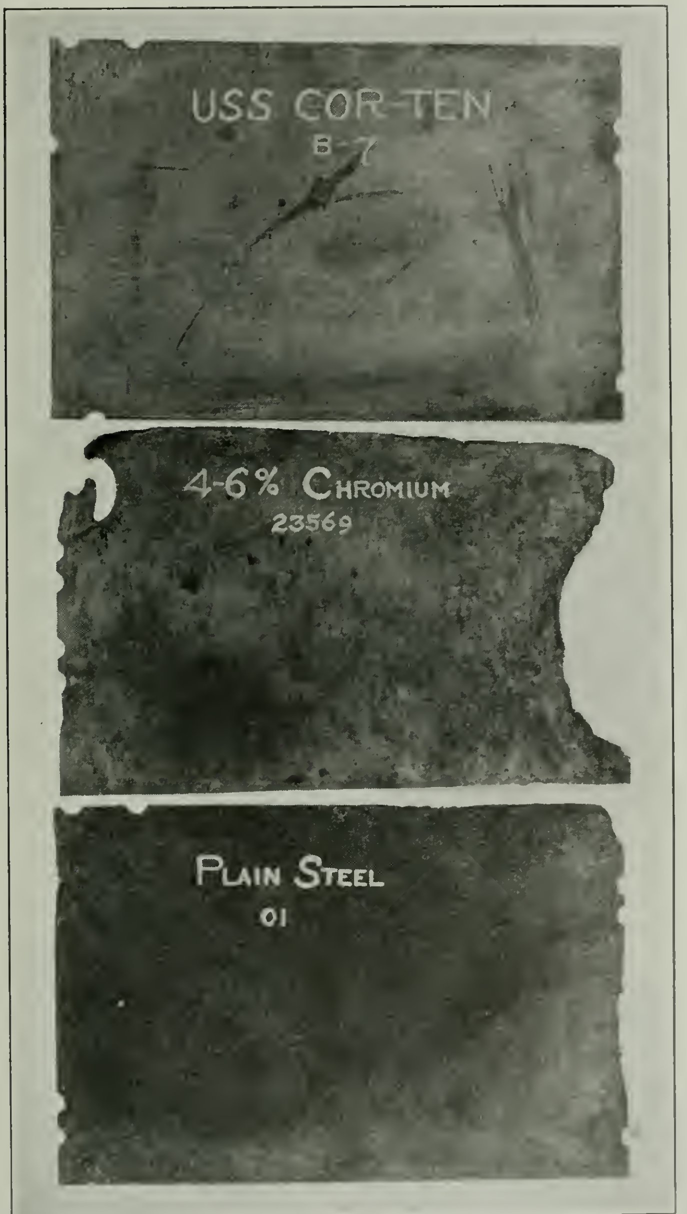

FIGURE 5.—USS COR-TEN is more durable in running mine water of an acid nature than other steels. These samples were immersed for eight weeks.

It has become evident that, in the operation of railroads in this country, coal cars are subject to two distinct kinds of service. One of these is the revenue-producing normal coal service in which the cars are moved promptly from mine to consumer and return. The durability of these cars depends principally on the quality of the steel used in the cars with respect to its resistance to atmospheric corrosion. The second kind of service—the service which should be eliminated—is an income-consuming service. It involves the storage of coal in cars for long periods of time. Here the durability of the equipment is a function of the kind of coal and the length of time coal is stored in the cars. It seems to be a matter of economy to spend 25 cents per ton to pick up coal with a bucket from a pile rather than pay about $700.00 for new bottoms and sides for every car in which coal has been stored for a year. It is true that probably less than 5% of the cars of the country receive this destructive service at any one time, yet it is also probably true that the period of usefulness of the other 95% is shortened by receiving, to a less degree, the same neglectful treatment. Serious consideration of this factor will point the way to substantial operating economies with present equipment.

It is obviously impossible to eliminate a certain amount of coal storage in cars. Short time storage, however, is not destructive. It has been established definitely that the leachings from a very high sulphur coal are not destructive in character until coal has been stored wet for more than three or four weeks. This means that a coal which produces highly corrosive leachings after a very long period of storage is harmless for the first few weeks. Much of the corrosion of cars usually attributed to coal can be eliminated by proper regulation of the cars to prevent storage for more than a few weeks.

Figure 6 shows a condition which is familiar to those who have closely inspected old hopper cars. The inside of hopper side sheets build up with corrosion products. Examination of these products has shown them to be substantially the same as the rust that forms on steel which has been exposed only to atmospheric conditions. There is no reason to believe that these products can be formed by any means other than atmospheric conditions.

The resistance of USS COR-TEN to atmospheric corrosion, to corrosion in running acid water which had filtered through coal in a coal mine, to abrasion and to denting indicates that this material should be more satisfactory for use in cars to be placed in normal service than the steel used in present equip-

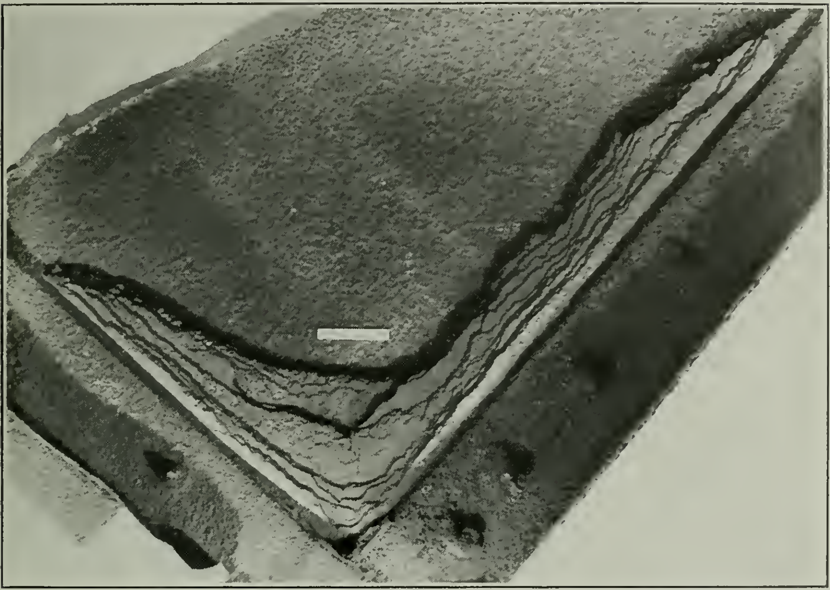

FIGURE 6.—The corrosion of open cars usually results in the formation of corrosion products similar to the built-up layers to be seen on the hopper side sheet in the photograph.

ment. Hopper cars and mine cars of COR-TEN are now in service.

APPLICATIONS

While COR-TEN steel is a comparatively recent development, it has already found considerable application in a great variety of equipment such as freight and passenger cars, streamlined trains, street cars and buses, tank trucks and mine cars.

CONCLUSION

With only a slight increase in first cost it is possible to obtain the benefits of weight reduction by the use of COR-TEN steel due to its higher yield point, greater ultimate strength and its resistance to impact shock and fatigue. This initially higher first cost, if any, is frequently more than offset by the benefits and savings resulting from the use of this high tensile corrosion resistant steel.

It is exceedingly difficult to arrive at a definite figure representing the economy made possible by a reduction in the dead weight of freight equipment because the problem involves many variables. For the Class I railroads of the United States as a whole, various figures between $13.50 and $46.25 per car per year have been obtained for the average saving that would be effected per ton of dead weight reduction.

Since the Class I railroads operate about 2¼ million freight cars as compared with some 60,000 passenger and Pullman cars, the greatest benefit would accrue from weight reduction in freight cars. With the possibilities of improved construction and resultant economies now made possible by the use of modern and improved materials, it would seem logical that extensive repairs to present equipment along established lines would appear to be uneconomical.

The foregoing does not mean that there is not likewise an attractive field for the high tensile steels in the construction of passenger coaches.

It should be remembered that the weight of limited trains has gradually increased 10 to 20 tons per passenger. A good passenger list for a 10 car Pullman train is now about 75 to 100. These ten cars weigh 800 to 850 tons while the engine and tender will bring the gross to more than 1,000 tons. These figures speak for themselves. It is not unlikely that the next few years will witness changes in the type of equipment that will promote lower operating costs and more efficient service to compete with the inroads of other means of transportation.

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PRESIDENT: This has been a very interesting presentation of a very appropriate subject at this particular time. We would like to have a free discussion of it. Any one who wishes to get on his feet and say anything about the paper or ask any questions now has the opportunity, and I am sure Mr. Johnston will be glad to answer them.

Unless some one volunteers promptly I will call on two gentlemen with whom I have arranged to discuss the paper.

(Upon inquiry it developed that both gentlemen, owing to the lateness of the hour, had been obliged to leave.)

Colonel Knable, of the Carnegie Steel Company, will you say a few words?

COL. G. E. KNABLE: It is quite late in the evening and the paper by Mr. Johnston has covered the subject so thoroughly that I think we had better eliminate any discussion and go at once to the food.

MR. J. B. BAKER: Would it be proper for a layman to ask a question?

PRESIDENT: We would be very glad to hear from you.

MR. BAKER: There are two things about this car that particularly interests me. I am especially interested in the relations. I would like to have from the speaker a little more fully the relationship of the weight to a car made of our ordinary iron or steel material. In other words take any capacity, say 50,000 or better 80,000 lbs., what is the weight of this car as compared with the weight of the present car of the same capacity? Second, are there any figures representing probable relative costs of this car and the present type of car?

MR. JOHNSTON: The light weight of 30,000 lbs., as compared with 43,000 or 44,000 lbs. for similar types of cars, is a reduction of about 13,000 lbs. The cubic capacity is increased to some extent by the center hopper which was described in the slides. The cost figures have not been arrived at definitely yet. Present information indicates that it will be only slightly higher than present cars of heavier material.

MR. W. C. VAN BLARCOM: The chemical analysis of Cor-Ten steel seems to be a little unusual due to the high phosphorus and copper contents. It would be of interest to know the advantage gained by the unusually high percentage of phosphorus. Also, is this a Bessemer steel or a re-phosphorized open hearth steel? Does this high phosphorus lower the impact value and increase the brittleness, which results from cold work on the steel?

MR. JOHNSTON: The high phosphorus content of Cor-Ten steel may seem a little unusual, but careful study extending over a number of years on several hundred different steels has indicated that the combination of elements in the percentages indicated in Cor-Ten steel are the most desirable from a standpoint of corrosion resistance and strength. This steel is a re-phosphorized open hearth steel. The high phosphorus does not lower the impact values and does not increase the brittleness; we would refer you to the values shown in Table I of 60 foot pounds for Izod and 22% elongation for thin sheets. For further information on the effect of phosphorus in steel we would refer you to the report of the joint committee of the ASTM "Influence of Sulphur and Phosphorus in Steel," preprint 1934.

MR. VAN BLARCOM: There is a question regarding the physical values of the regular open hearth steel shown for comparison. I believe this steel contained 0.10 carbon and 0.50 manganese and had a tensile strength of 35,000 pounds per square inch and an Izod value of 30 foot pounds. Would not a steel of this carbon and manganese content be more apt to have a tensile strength of 45,000 pounds per square inch and an Izod value of 60 foot pounds?

MR. JOHNSTON: With reference to the physical properties of regular open hearth steel shown for comparison in Table 1, the values were for a steel of .10% carbon maximum and .50% manganese maximum, and in sheets these amounts would be somewhat under the upper limits. The tensile strength of such steels was indicated as a range of 35,000 to 50,000 pounds per square inch. These values were based upon annealed material and might perhaps be higher in the as rolled condition.

PRESIDENT: Is there any other discussion? If any one wishes to take up any feature of the paper the chair will recognize you. If not I will ask Mr. Lanahan, Chairman of the Executive Committee, to close the discussion.

MR. FRANK J. LANAHAN: It is apparent that everybody wants this meeting to come to a close, and if I were to say all the things I have in mind, it is a certainty that what is scheduled as a lunch would turn out a breakfast. The evidences of the New Deal in life are concretely illustrated here tonight in the novel subject presented by our guest speakers, in the voluminous comments of our President and the unique entertainment that has been afforded us. We "old timers" would have to pinch ourselves to make certain we were not dreaming and strayed into the wrong room, what Rufus has been doing to the dear old lady (the Railway Club) by bobbing and marcelling her hair, lifting her face, rouging her lips and coloring her nails, and I am afraid that in his modernistic tendency he may yet teach her to smoke cigarettes, take a highball or two, but if he only refrains from taking her out to night clubs, we may rest more comfortably.

Mr. President, I congratulate you on your wonderful start. You certainly have done wonders! One hundred sixty-eight new members with an addition of $500.00 to the Club's revenue, are worthy of the highest praise and thanks on the part of the entire membership. Am sure the Club would like to pay tribute to you for these remarkable results. May I ask all in favor of giving the President a vote of appreciation for his accomplishments to please rise? Mr. President, the vote is unanimous.

PRESIDENT: I asked Mr. Lanahan to make a certain motion, but that is not the motion I asked him to make. I certainly appreciate the compliment, but you haven't seen anything yet.

MR. FRANK J. LANAHAN: Mr. President would move that the Club express its appreciation of the intelligent, educational and entertaining talk that was given here tonight. It is certainly one of the most modern things a railroadman could hear, and in behalf of the organization, I move a rising vote of thanks to Mr. Johnston and Mr. Schramm.

The motion prevailed by unanimous rising vote.

PRESIDENT: We have up here some circulars which the Pressed Steel Car Company have sent in, and any one interested may have a copy. Luncheon will be served at either end of the room, and there is yet time for more singing if you so desire. I would ask especially that those interested in singing give their names either to Mr. Gillespie or to the Secretary, so we may get it organized.

If there is no further business the meeting will stand adjourned.

J. D. CONWAY, Secretary.

In Memoriam

W. C. LANG,

Joined Club October 27, 1911

Died October 26, 1934

OFFICIAL PROCEEDINGS

RAILWAY CLUB OF PITTSBURGH

$1.00 Per Year 25¢ Per Copy

Vol. XXXIV. DECEMBER 20, 1934. No. 2.

STANDARDS OF LOCOMOTIVE PERFORMANCE—THEIR ESTABLISHMENT AND ACHIEVEMENT

By MR. JOHN L. DAVIDSON, Mechanical Engineer,
Valve Pilot Corporation, New York, N. Y.

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
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Pittsburgh, Pa., Dec. 20, 1934

$1.00 Per Year
25c Per Copy

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OFFICIAL PROCEEDINGS
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EXECUTIVE COMMITTEE:

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D. W. McGEORGE, Secretary, Edgewater Steel Company, P. O. Box 249, Pittsburgh, Pa.
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D. K. ORR, Road Master, Monongahela Railway Co., Brownsville, Pa.

PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
DECEMBER 20, 1934

The meeting was called to order at the Fort Pitt Hotel at 8:00 o'clock, P. M., with President R. H. Flinn in the chair.

Registered attendance, 168, as follows:

MEMBERS:

Adams, Frank W.
Ambrose, W. F.
Balzer, C. E.
Beam, E. J.
Berg, Karl
Best, C. Thomas
Bishop, M. L.
Britt, T. E.
Brown, J. Alexander
Buffington, W. P.
Burel, W. C.
Callahan, F. J.
Cannon, T. E.
Carlson, L. E.
Carson, John
Carruthers, G. R.
Christy, F. X.
Christy, G. J.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Cooper, S. H.
Courtney, H.
Crenner, J. A.
Dailey, F. J.
Dalzell, W. E.
Dambach, C. O.
Davis, Charles S.
Diven, J. B.
Downes, D. F.
Durell, W. A.
Emery, E.
Endsley, Prof. Louis E.
Escott, Charles M.
Fair, J. M.
Flinn, R. H.
Folan, J. V.
Forsberg, R. P.
Fralic, C. F.
Frauenheim, A. M.
Frauenheim, Pierce H.
Gatfield, Philip I.
Gilbert, William J.
Gillespie, J. Porter
Glenn, J. H.
Goda, P. H.
Goldstrom, G. E.
Haller, Nelson M.
Hawkins, J. M.
Hayward, C.
Hemma, C. H.
Hilstrom, A. V.
Hocking, Harry A.
Holmes, E. H.
Honsberger, G. W.
Huff, A. B.
Johnson, Ira S.
Kelly, J. W.
Kentlein, John
Kirk, W. B.
Klassen, F. G.
Koch, C. W.
Kuhn, S. H.
Lanahan, Frank J.
Lanahan, J. S.
Lanning, Edward H.
Lehr, Harry W.
Lynn, Samuel
Maliphant, C. W.
Mayer, L. I.
Misner, George W.
Mitchell, W. S.
Moir, W. B.
Moore, Donald O.
Morgan, Homer C.
Murray, C. C.
Murray, Stewart
Myers, R. H.
McCracken, C. M.
McHugh, C. A.
McIlwain, J. P.
McIntyre, R. C.

McKenzie, Edward F.
McKinley, John T.
McLaughlin, H. B.
McMillan, A. P.
McNamee, W.
McTighe, B. J.
Niklaus, C. G.
O'Leary, J. J.
O'Sullivan, J. J.
Overholt, B. C.
Passmore, H. E.
Pickard, S. B.
Purchard, Paul
Rauschart, E. A.
Reed, M. R.
Rodeniser, B. H.
Rodkey, C. C.
Ross, C. R.
Rowles, H. N.
Roy, L. E.
Ryan, Frank J.
Schadt, A. D.
Schaffer, W. E.
Schultz, D. C.
Searles, E. J.
Sersch, J. G.
Severn, A. B.
Sheridan, T. F.
Shingledecker, John C.
Sixsmith, G. M.
Smith, A. H.
Smith, D. J.
Smith, M. A.
Smith, Theodore F.
Snyder, F. I.
Stoffregen, Louis E.
Swope, B. M.
Sullivan, P. W.
Sutherland, Lloyd
Taylor, H. D.
Teufel, W. O.
Thomas, George P.
Thomas, H. N.
Thomas, Theodore
Tracey, J. B. A.
Trax, L. R.
Triem, W. R.
Tryon, I. D.
Tucker, John L.
Urtel, E. J.
Van Blarcom, W. C.
Vowinkel, Fred F.
Wait, William Bell
Watt, Herbert J.
Warfel, John A.
Webb, W. W.
Weis, Frank
West, Troy
Wheeler, C. M.
Wikander, O. R.
Wildin, George W.
Wilson, W. S.
Wright, Edward W.
Yarnall, Jesse

VISITORS:

Barber, M. H.
Bender, H. P.
Biggard, W. J.
Boland, Thomas
Davidson, J. L.
Dezort, Frank
Frymire, B. M.
Goodwin, A. E.
Greene, Arnold
Henderson, Gene N.
Hodges, A. H.
Kane, K. J.
Leonard, G. I.
Lewis, S. B.
Schwilm, L. J.
Sewell, R. H.
Sloan, J. W.
Smith, Sion B.
Snitehurst, J. H.
Tomlinson, Charles H.
Williams, B.
Wills, J. G.

Before entering upon the business meeting a delightful half hour of music was presented, under the auspices of the new Music Committee set up, presenting the Club's own Quartette and a session of community singing.

PRESIDENT: I do not know whether you have appreciated and enjoyed this as much as I have, but I think our initial musical effort has been very good and I want to congratulate the Committee on the start they have made.

Omitting the roll call and the reading of the minutes of the last meeting, I am going at once to the announcement of new members. While we have not as long a list as we had at the last meeting, I am going to read into the ranks 70 new members. You will know by this time that you have a real Membership Committee. As was done at the last meeting, as I read out the names of the new members I want them to stand up so we will know them and the Reception Committee will be able to spot them. You have noticed the new badges on the Reception Committee. You know who they are and they want to know who you are.

Barr, S. T., Air Brake Instructor, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. B. Moir.

Batson, J. F., Assistant Master Mechanic, Pennsylvania Railroad Company, Pitcairn, Pa. Recommended by G. M. Sixsmith.

Best, C. Thomas, President, American Shim Steel Company, 1304 Fifth Avenue, New Kensington, Pa. Recommended by T. E. Britt.

Bingham, W. C., Proprietor, Bingham Metal Company, Law & Finance Building, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Boden, A. S., Traffic Manager, Coal Control Association Western Pennsylvania, Oliver Building, Pittsburgh, Pa. Recommended by W. P. Buffington.

Booth, W. F., Assistant Superintendent, B. & O. R. R., B. & O. Station, Pittsburgh, Pa. Recommended by T. E. Britt.

Buck, E. R., Assistant Master Mechanic, Pennsylvania Railroad Company, 7141 Thomas Boulevard, Pittsburgh, Pa. Recommended by G. S. Anderson.

Carr, John S., President, John Carr Coal Company, Adamsburg, Pa. Recommended by G. M. Sixsmith.

Christopher, Nicholas, Sales Manager, Meadow Gold Dairies, Inc., Forbes and Boyd Streets, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Christy, G. J., Electrician, Gardner Sign Company, 4040 Mintwood Street, Pittsburgh, Pa. Recommended by F. X. Christy.

Connolly, R. D., Metallurgical Department, Carnegie Steel Company, 317 North Dallas Avenue, Pittsburgh, Pa. Recommended by Dr. J. S. Unger.

Craig, W. J., District Boiler Inspector, B. & O. R. R., 324 Ashton Avenue, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Croft, C. A., Salesman, A. M. Byers Company, Clark Building, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Curtis, V. K., Sales Representative, Copperweld Steel Company, Glassport, Pa. Recommended by T. E. Britt.

Dawson, V. N., District Storekeeper, B. & O. R. R., B. & O. Station, Pittsburgh, Pa. Recommended by T. E. Britt.

Dean, E. E., Car Foreman, B. & O. R. R. Co., 1218 Evergreen Avenue, Millvale, Pa. Recommended by T. E. Britt.

East, Louis P., Live Stock Supervisor, Pennsylvania Railroad Company, 21 N. W. Fifth Street, Richmond, Indiana. Recommended by G. M. Sixsmith.

Eckels, Wilber, Representative, Cardwell Westinghouse Company, 332 South Michigan Avenue, Chicago, Ill. Recommended by E. A. Rauschart.

Eiland, C. L., General Foreman, Pullman Company, 2728 Broadway, Dormont, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Ferguson, George, Air Brake Instructor, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by W. B. Moir.

Folan, J. V., Clerk, Pennsylvania Railroad Co., 7720 St. Lawrence Avenue, Swissvale, Pa. Recommended by Harry W. Lehr.

Forbriger, E. A., District Maintenance of Way Storekeeper, B. & O. R. R. Co., 4333 Winterburn Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Fralic, C. F., Section Stockman, B. & O. R. R. Co., 3470 Beechview Boulevard, Pittsburgh, Pa. Recommended by T. E. Britt.

Frushour, H. T., Division Superintendent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. C. Miller.

Goldstrom, Gus, Draftsman, P. & W. Va. Ry., 1305 Highman Street, Pittsburgh, Pa. Recommended by C. O. Dambach.

Graf, Benjamin, Foreman M. E. Department, Pennsylvania Railroad Co., 1425 Straka Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Hawkes, T. L., Station Master, Pennsylvania Station, Pennsylvania Railroad Co., 328 South Fairmont Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Hawkins, J. M., District Sales Manager, Elwell-Parker Electric Company, Investment Building, Pittsburgh, Pa. Recommended by W. A. Durell.

Hemma, Charles H., Draftsman, P. & L. E. R. R., 1210 Valley Street, McKees Rocks, Pa. Recommended by Karl Berg.

Hibbetts, E. C., President, Meadow Gold Dairies, Inc., Forbes and Boyd Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Holland, S. E., Asst. Division Engineer, Pittsburgh Division, Pennsylvania Railroad Co., 318 West Street, Wilkinsburg, Pa. Recommended by G. M. Sixsmith.

Hopper, George, Chief Clerk to Terminal Agent, B. & O. R. R. Co., Grant & Water Streets, Pittsburgh, Pa. Recommended by T. E. Britt.

Horne, John S., Gang Foreman, Passenger Car Inspectors, Pennsylvania Railroad Co., 427 South Pacific Avenue, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Hunt, Roy A., President, Aluminum Company of America, Gulf Building, Pittsburgh, Pa. Recommended by Thomas C. Wurts.

Hyanes, Bert, Mechanical Representative, New York Air Brake Company, 3613 Gwynnoak Avenue, Baltimore, Md. Recommended by T. E. Britt.

Kellerman, Dewey W., Clerk, Pennsylvania Railroad Co., 1430 Nixon Street, N. S. Pittsburgh, Pa. Recommended by F. X. Christy.

Kerr, Charles, Jr., Westinghouse Electric & Manufacturing Company, 151 Race Street, Edgewood, Pa. Recommended by G. W. Honsberger.

Klein, J. W., President & General Manager, Pittsburgh Refrigeration Company, 1115 Penn Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Koch, C. W., Clerk, P. & L. E. R. R. Co., 1257 Clairhaven Street, Pittsburgh, Pa Recommended by Lloyd Sutherland.

Lanning, Edward H., Acting Gang Foreman, Pennsylvania Railroad Company, 6832 McPherson Boulevard, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Lear, E. J., Hostler, B. & O. R. R. Co., 713 Freeland Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Marsh, E. A., Car Foreman, B. & O. R. R. Co., 2830 Louisiana Avenue, Dormont, Pittsburgh, Pa. Recommended by T. E. Britt.

Mills, O. B., Stationery Storekeeper, Pennsylvania Railroad Co., 11th Street Freight Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Meneyhun, W. J., Claim Agent, B. & O. R. R. Co., B. & O. Station, Pittsburgh, Pa. Recommended by T. E. Britt.

Murray, Charles C., Assistant Chief Clerk to Storekeeper, B. & O. R. R. Co., 5312 Gertrude Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Myers, Robert H., Sales Manager, American Shim Steel Company, 1304 Fitfh Avenue, New Kensington, Pa. Recommended by T. E. Britt.

Porterfield, W. B., Shop Superintendent, B. & O. R. R. Co., 25 Rosemont Avenue, Mt. Lebanon, Pittsburgh, Pa. Recommended by T. E. Britt.

Rankin, Charles D., Clerk, Pennsylvania Railroad Co., 1503 Woodland Avenue, N. S., Pittsburgh, Pa. Recommended by F. X. Christy.

Riley, O. W., Chief Clerk to Storekeeper, B. & O. R. R. Co., 2606 Belmar Place, Swissvale, Pa. Recommended by T. E. Britt.

Rodeniser, B. H., Vice-President, Meadow Gold Dairies, Inc., 6418 Jackson Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Roy, L. E., Gang Foreman, Pennsylvania Railroad Company, 117 Peebles Street, Wilkinsburg, Pa. Recommended by Harry W. Lehr.

Schaffer, G. F., Assistant Storekeeper, B. & O. R. R. Co., 307 Winston Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Schaners, Robert W., General Foreman Stores Department, B. & O. R. R. Co., 495 Muldowney Avenue, Lincoln Place, Pa. Recommended by T. E. Britt.

Scheline, William A., Gang Foreman, Pennsylvania Railroad Company, 2200 Holyoke Street, N. S., Pittsburgh, Pa. Recommended by Harry W. Lehr.

Schmitt, Andrew, Car Repairman, B. & O. R. R. Co., 2626 Linwood Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Schoch, A. J., Application Engineer, Westinghouse Electric & Manufacturing Company, 5863 Hobart Street, Pittsburgh, Pa. Recommended by G. W. Honsberger.

Schramm, G. N., Corrosion Research Laboratory, American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa. Recommended by O. R. Wikander.

Scudder, D. F., District Superintendent, The Pullman Company, Gulf Building, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Shaffer, R. G., Agent, Pennsylvania Railroad Co., Box 97, Emlenton, Pa. Recommended by G. M. Sixsmith.

Shuster, C. A., Agent, Pennsylvania Railroad Co., Box 46, Red Bank, Pa. Recommended by G. M. Sixsmith.

Smith, A. H., Sales Engineer, Kerite Insulated Wire & Cable Company, 30 Church Street, New York, N. Y. Recommended by J. M. Fair.

Smith, Theodore F., Asst. to Vice-President, The Safety Car Heating & Lighting Company, Park Mansions, Pittsburgh, Pa. Recommended by J. Porter Gillespie.

Stevenson, H. G., Chief Clerk, Engineering Department, Hillman Coal & Coke Company, First National Bank Building, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Thompson, H. C., Salesman, Air Reduction Sales Company, Grandview Avenue, Glenshaw, Pa. Recommended by E. A. Rauschart.

Wait, William Bell, President, Valve Pilot Corporation, 230 Park Avenue, New York, N. Y. Recommended by R. H. Flinn.

Webb, William W., Manager, National Carloading Corporation, 1013 Penn Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Weis, Frank E., Transportation Clerk, Pennsylvania Railroad Co., 26 East Crafton Boulevard, Pittsburgh, Pa. Recommended by W. R. Triem.

Wilkinson, William E., Assistant Foreman, The Pullman Company, 4819 Broad Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.

Zearley, J. P., Assistant Supervisor, Track, Pennsylvania Railroad Co., 1034 Murrayhill Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Ziegler, S. L., Gang Foreman, Pennsylvania Railroad Co., 233 Martsolf Avenue, West View, Pittsburgh, Pa. Recomemnded by Harry W. Lehr.

Next in order is Reports of Committees. I see Herb. Watt back there by the door. He is Chairman of the Membership Committee and I will ask him to make a report for that Committee.

MR. HERBERT J. WATT: You will all remember the mark that was set for us last month by Mr. Flinn, 1,000 members active in the Club by the January meeting. Last month we had reported a membership of 746. 169 were taken in at that meeting and 70 tonight. Six former members have been reinstated. Those figures total up 991. And the Committee has some excellent prospects. Everyone who has been at the meetings this fall whom we can reach in any way has either been interviewed in person or has had a letter from some member of the Committee, and we expect at the January meeting that this figure of 1,000 which Mr. Flinn has in mind will not only be achieved but exceeded.

You will remember the resolution passed at the last meeting to take care of members delinquent in one way or another. A survey of the membership showed 116 in that classification. All of those members have been circularized by the Committee and up to date we have something like 19 who have qualified under the resolution and there is reason to think the number will be materially increased.

In addition to that and not shown in any of these figures, we have members on the suspended list. Mr. Conway has written to all of them and tonight we have six such members who have come back into the Club. So there is little question that before the January meeting we shall have reached the goal Mr. Flinn has set up.

One thing ought to be said once more. The purpose of the Club is not merely members, but to have such number as will enable us to furnish better programs than otherwise could be the case. That is one aim in seeking this increase in membership. Another, of course, is that if there are people in the district to whom the Club has anything of value to offer, we ought to see that they are made familiar with it and given a chance to come in.

PRESIDENT: Thank you, Mr. Watt. This 1,000 is only a minimum. We are going to have that before the January, 1935, meeting. After that the Membership Committee can do anything it wants, but it will by no means be discharged. It will be a big assistance to the officers to have a substantial paid up membership. We can do many things that we otherwise could not do.

Has the Chairman of the Reception Committee any remarks to make at this time, Mr. Sixsmith?

MR. G. M. SIXSMITH: There is one comment that I would like to make that has a bearing on the activities of our last meeting. You will recall the President asked the Chairman of the Reception Committee to introduce the members of that Committee. However, in connection with complying with this request, I overlooked one of our most enthusiastic and serious members in the person of Mr. J. S. Lanahan, and I want to take the opportunity afforded on this occasion to apologize to Mr. Lanahan and the members of the Club for that oversight.

You will notice that the members of the Reception Committee are all dressed up to night with identification badges, and if you do not know us already, personally, the badge identifies us, and we are going to try to carry out the idea expressed by Mr. Flinn, and that is, to assume more leadership in promoting greater activity, sociability and acquaintanceship among the members of this Club during the present season, and the co-operation of the membership along these lines will be much appreciated.

PRESIDENT: Thank you, Mr. Sixsmith. From what we have seen of the Reception Committee tonight I am sure they will live up to their responsibilities.

Mr. Secretary, are there any announcements?

SECRETARY: Since our last meeting we have received information of the death of three of our members, H. M. Ricker, Freight Agent, P. & L. E. R. R., died December 17, 1933; H. S. Tarr, Clerk, Union Railroad, died June 1, 1934, and F. J. Nannah, Engineer Maintenance of Way, P. & L. E. R. R., died December 11, 1934.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings.

We had a business session of the Executive Committee just before this meeting. Does Mr. Frank J. Lanahan, Chairman of the Executive Committee, have certain matters to present to the Club at this time?

MR. FRANK J. LANAHAN: At the last meeting our considerate President presented an amendment to the By-laws having to do with the dues of those who had not remitted over a period of time. That matter is presented in the following Resolution offered by the Executive Committee:

WHEREAS, owing to severe financial stress during the past several years, many of our members have not paid their annual dues and are now relinquent and subject to suspension, and

WHEREAS, those delinquent members may be lost to the Club unless some prompt action is taken;

NOW, THEREFORE, BE IT RESOLVED, that all membership dues remaining unpaid for the year 1933 and previously be cancelled and further that any now delinquent member will be restored to good standing and have his unpaid 1934 dues cancelled upon payment of 1935 dues, which are now payable, providing such member avails himself of this special privilege before the January, 1935, meeting.

Mr. President, I move the adoption of that Resolution.

The Resolution, being duly seconded, was adopted by unanimous vote.

MR. FRANK J. LANAHAN: The Second Resolution might properly come under the title of New Business.

PRESIDENT: Go right ahead with it now.

MR. LANAHAN: The energies of our President have not been confined to just this one subject. In going over the records of the organigation it has occured to him that the revenues of the Club could be considerably increased if more attention were devoted to soliciting advertising in the "Proceedings." There was a time before Old Man Depression held sway when this publication under the management of Mr. Conway paid for itself. Mr. Flinn in a commendable effort to augment the Club's revenue, has suggested a special committee to assist Mr. Conway in getting advertising for the publication. There is nothing in the Constitution or By-laws to prevent the appointment of such a Committee. As a matter of fact, the Executive Committee recommends it, and it is my privilege to make the motion in behalf of the Executive Committee that the President appoint a special advertising committee to whom will be given the duty of soliciting advertising for the Club "Proceedings."

(The motion, duly seconded, was carried by unanimous vote.)

MR. LANAHAN: There is still one other subject. The President has considered suggestions made to him by the chairmen of the Reception and Membership Committees, so he would like to have them both enlarged. As our By-laws require the members of these Committees to be elected at the Annual Meeting by ballot, the Executive Committee recommends that six Associate Members be added to each of these Committees, to be appointed by the President, and on behalf of the Executive Committee I move such action.

(The motion, duly seconded, prevailed by unanimous vote.)

PRESIDENT: The Chair will name these new members later. I have not had opportunity to consider the personnel of these Committees yet. I will say for the Chairman of the new Advertising Committee that I have a present of three ads for him already.

May I ask your indulgence while I review two or three things we did at the last meeting. I trust the speakers will be patient with me also. I announced at the last meeting that we were going to adopt a new policy and asked for a vote of the Club members to determine whether they approved it, and they did approve. The policy is this, that we will no longer pick out from the registration cards victims to be dragged up to discuss the papers. We will always have Club members or visitors who may want to ask questions or speak on the subject for discussion, and opportunity will gladly be given them to do so. But I am not going to call on members to get up and talk when they don't want to. In order to have an intelligent discussion of the paper of the evening I shall endeavor to arrange beforehand with several members to have something to say about the paper. At the proper time I hope they will get up and enter into the discussion. But I wish you to understand that whenever I call on any one it has been pre-arranged and they are not being called on unexpectedly.

Another thing is a practice of introducing new members to get them actively engaged in the affairs of the Club. We wish every new member to get acquainted with the other members and interest himself in the affairs of the Club and become active in whatever way appeals to him. You have observed some very active new members around the piano tonight. They are members of the Club, every one of them. And I want again to congratulate Mr. Gillespie for what he has accomplished, and every member who can sing, or who thinks he can sing, is urged to join up.

The Reception Committee has prepared a lunch at both ends of the room and we hope nobody will go without a visit to the tables:

I have been told that some of the new members received at the last meeting did not get the postal card announcement of this meeting. I do not understand that, for the Secretary assures me that all the cards were sent out. It may be that Uncle Sam slipped up on it. Every member received tonight should get the notice of the next meeting.

If there is no further business to be taken up at this time, we will proceed at once to the paper of the evening. We have with us tonight Mr. John L. Davidson, Mechanical Engineer, Valve Pilot Corporation, New York City, who will present a paper on the subject: "Standards of Locomtive Performance—Their Establishment and Achievement."

STANDARDS OF LOCOMOTIVE PERFORMANCE—THEIR ESTABLISHMENT AND ACHIEVEMENT

By MR. JOHN L. DAVIDSON, Mechanical Engineer,
Valve Pilot Corporation, New York, N. Y.

The necessity for the establishment of correct standards of locomotive operation is obvious. The best evidence of this is the thousands of time-tables issued by the American railroads. A time-table is the standard of train performance. Back of the standard of train performance there must be a standard of locomotive performance. Upon the quality of that standard depends the quality of the service rendered the public.

The better the service offered, the more important becomes the role of the men upon whose shoulders rests the responsibility for getting the trains over the road on time and with the least expenditure of fuel and other supplies.

In the final analysis the capability of the man in the cab is the measuring stick by which the standard of performance is established and very often it must be established at the level of the average man rather than at the level of the exceptional man.

The locomotive engineman has a multiplicity of instructions to follow. The Air Brake Supervisor, the Road Foreman of Engines, the Master Mechanic, the Division Superintendent, the Roadway Engineer—all compile operating instructions which they know as a result of many years of experience will, if followed, produce a high standard of locomotive performance.

The engineman must absorb all of these instructions, interpret their meaning with respect to his particular problem, coordinate them and translate them into actual results by striving to produce a standard of locomotive performance acceptable to the management and a standard of train performance satisfactory to the users of railway transportation.

This is a man-sized job and is generally handled very creditably as evidenced by the progressive improvement made in locomotive performance during recent years, but opportunities for still further improvement are constantly being presented.

An important and ever-present operating problem before any railway, once standards of performance are set up, is the maintenance of these standards at a level sufficiently high to insure a continuance of patronage from present shippers and travelers and by dint of superior service to attract additional business from competing lines or competing methods of transportation.

To achieve and maintain a high standard of efficiency requires constant supervision of equipment and personnel and the establishment of a method of instruction which will involve a minimum of lost motion and insure a maximum of good results. Herein lies the sphere of activity of the Road Foreman of Engines.

Road Foremen of Engines are outstanding enginemen who have proved by their ability and good judgment that they can accept the responsibilities of leadership and supervision. Road

Foremen of Engines are very necessary to the efficient operation of a railroad and their presence does not cast an unfavorable reflection on the intelligence and capability of the enginemen. Each Road Foreman is the point of contact between his crews and the management and he constitutes the medium for the exchange of ideas between them.

Most of the routine work of the Road Foremen is done for

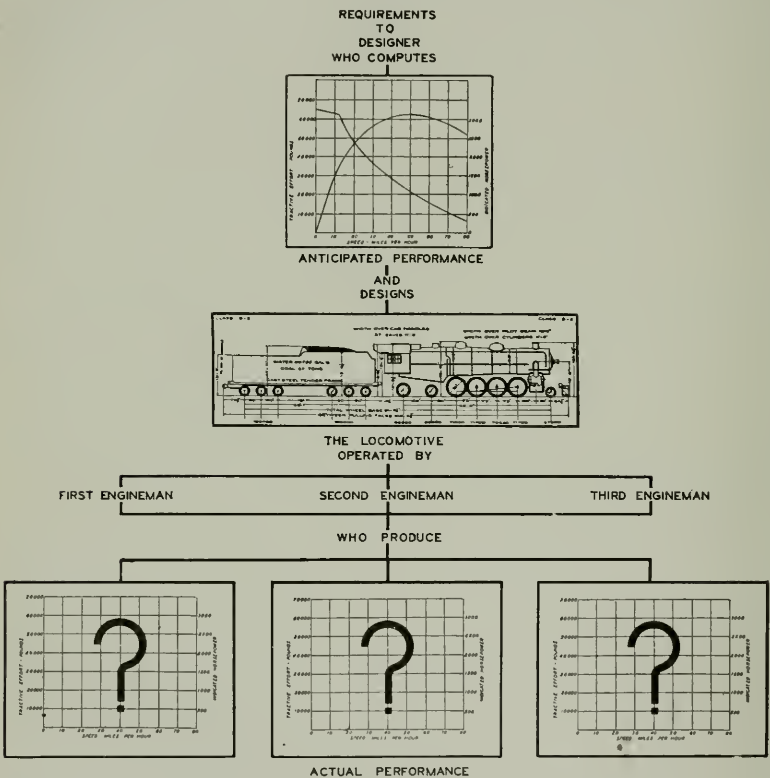


FIG. 1.—In the Absence of a Record Locomotive Operation in Accordance with Enginemen's Judgment is an Unknown Quantity.

one or both of two purposes—to instruct enginemen or to observe and report upon the performance of locomotives under varying conditions of service, keeping this goal always in view—the establishment, achievement and maintenance of what appear to be correct standards of locomotive performance. They set up the mark at which to shoot and on them devolves the duty of seeing that the percentage of bull's eyes is high. This applies to locomotives as well as men.

Keeping within the limitations imposed by the physical characteristics of the roadway structure, each road locomotive is designed to fulfill certain operating requirements. Assuming that the locomotive will be correctly operated, the designer can compute with a fair degree of accuracy the anticipated performance of the locomotive, but once the locomotive is built and starts hauling trains it is difficult to know except in a general way just what kind of a job each engineman is doing because in practice the output of each has been estimated rather than measured. (Figure 1). It may be known that during a given period the average performance of the group is good, but without a record it is difficult to definitely single out the engines whose mechanical condition, or the men whose mode of operation is such as may show room for improvement. Some enginemen will better the anticipated performance, some will equal it, others will fall short of it.

Assuming that the locomotive is in first-class mechanical condition, each man's performance will be a direct measure of his ability to absorb and put into practice the principles of locomotive operation which he has been taught by his Road Foreman. If the Road Foreman is to make the most effective use of his time, it is obvious that he must concentrate on improving the performance of those men who fall short of the mark and direct his attention to those locomotives which by reason of their mechanical condition are unable to measure up to the established standards.

Modern locomotives develop so much power that it would seem desirable to measure their performance rather than to estimate it. It would appear that some plan is necessary to insure that locomotives will be maintained in a condition to do their best and that their performance will be measured in terms of relative man performance in order to know that they are operated to best advantage and thus are paying their way by earning a fair return on the investment and maintenance cost. This means reducing the number of engines handled to a minimum, by maintaining them so that they will develop their maximum capacity and maximum mileage, and establishing a gauge by which to determine that their capacity is fully and efficiently utilized.

This can be done by equipping each locomotive with an instrument whose indication guides the engineman in the operation of the locomotive and whose autographic record measures the output of the locomotive. The record is the story of the method of operation used by the man and of the response of the locomotive to that method of operation. If each engineman correctly follows the indication of the instrument, the records made by all of them under similar operating conditions will be alike

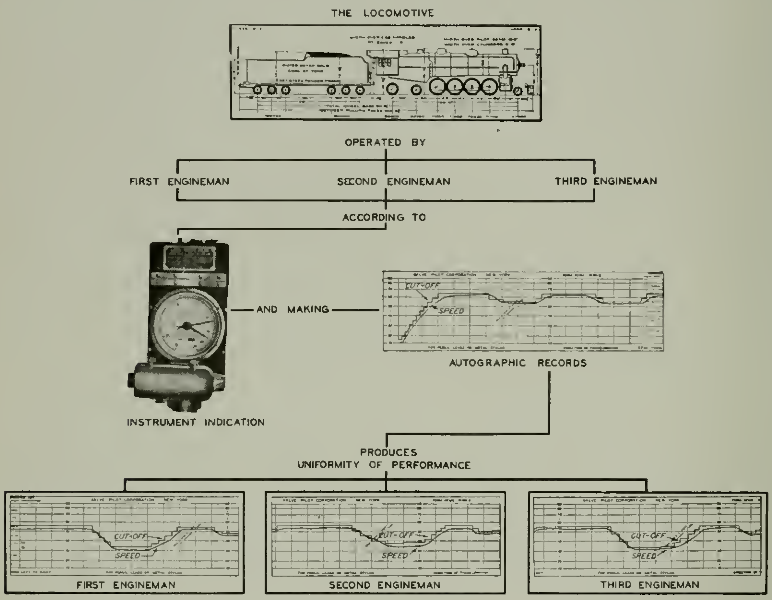


FIG. 2.—Locomotive Operation Achieved by Instrument Indication and Followed up with Autographic Records Makes for Uniformity of Performance.

and of a uniform high standard of efficiency. (Figure 2). By means of analysis and comparison of all the records it can be readily ascertained which men and which locomotives are above or below the general average of the group.

Since the days of Stephenson and Walschaert the effective use of the expansive force of steam has been and continues to be the standard by which locomotive operation is measured. The selection of cut-off is closely related to speed, draft, horsepower, tractive force and fuel consumption. Dynamometer tests show that slight defects in valve gear, packing, front-end arrangement and in the general mechanical condition of the locomotive have a greater effect on its performance than is generally supposed. Such defects must be compensated for by the engineman in his selection of cut-off. He must perforce use a longer and consequently less economical cut-off to do the job in hand than would be required if these defects were not present.

Dynamometer tests further indicate that for each locomotive of a given class there is a very definite relationship between speed and cut-off on the one hand and tractive force on the other —that is, at a given speed there is one correct cut-off which will produce maximum tractive force at that speed.

Why can we not then take advantage of these well-known facts by giving each engineman a visual guide to cut-off selection predicated on the basic relationship betwen speed and cut-off and tractive force, and carrying it a step further, enable each locomotive to write a story of its performance by autographically recording speed and cut-off? Will not the visual indication enable each engineman to get the most out of each locomotive from the standpoint either of hauling capacity or economy, as condi-

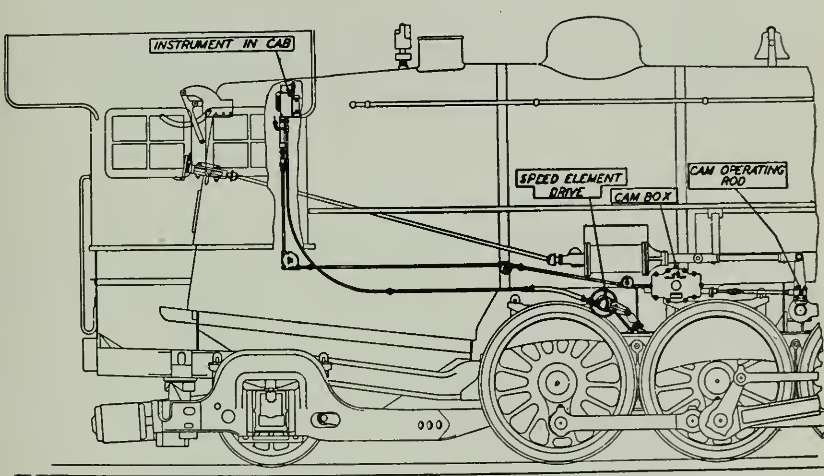


FIG. 3.—Diagramatic View of the Loco Valve Pilot Applied to a Locomotive.

tions may require? Will not the autographic record provide a method for measuring the output of each locomotive and by comparative analysis assist supervisory officers and enginemen not only to establish and achieve but also to maintain a high standard of efficiency of locomotive performance?

The visual indication in the form of an instrument must not supplant the engineman's judgment, but rather, shall we say, should supplement it by enabling him to quickly absorb and consistently put into practice the finer points of locomotive operation. Nor must it attempt to make an automaton of the engineman by asking him to do his job with the unvarying precision of a machine because monotony dulls the intellect and stifles initiative. By the same token it should not perform automatically the functions which by reason of experience and judgment and varying operating conditions are rightly delegated to the engineman. It should indicate the potentialities of the tremendous power plant entrusted to his care and point out to him how best to take advantage of them. Its indications should be simple and capable of being read at a glance, providing a mini-

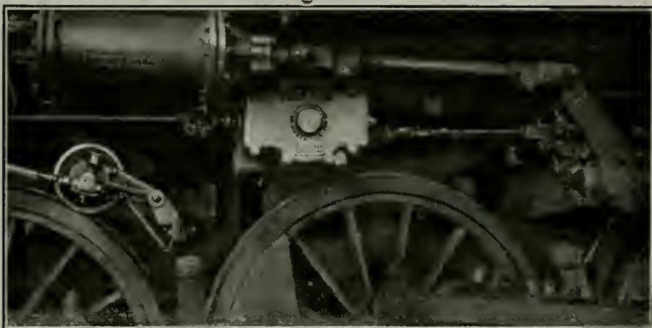


FIG. 4.—Tumbling Shaft Connection, Cam Box and Friction Drive Unit.

FIG. 5.—The Loco Valve Pilot in the Locomotive Cab.

mum of distraction from the many other important duties of the engineman.

These are the ideas underlying the development of the Valve Pilot which is the embodiment of methods proved by tests rather than the name of a device. Briefly, the Valve Pilot, the construction and application of which is illustrated in Figures 3 to 8, inclusive, is a speed indicator and recorder combined with a cut-off indicator and recorder. Cut-off is expressed in terms of speed rather than in terms of per cent of piston stroke. There are two hands on the dial of the instrument; a red hand which indicates speed and a black hand which indicates cut-off. The cut-off indications are transmitted to the instrument in the cab (Figure 5) through a cam mechanism (Figure 6) actuated by the tumbling shaft . The cam producing these indications is

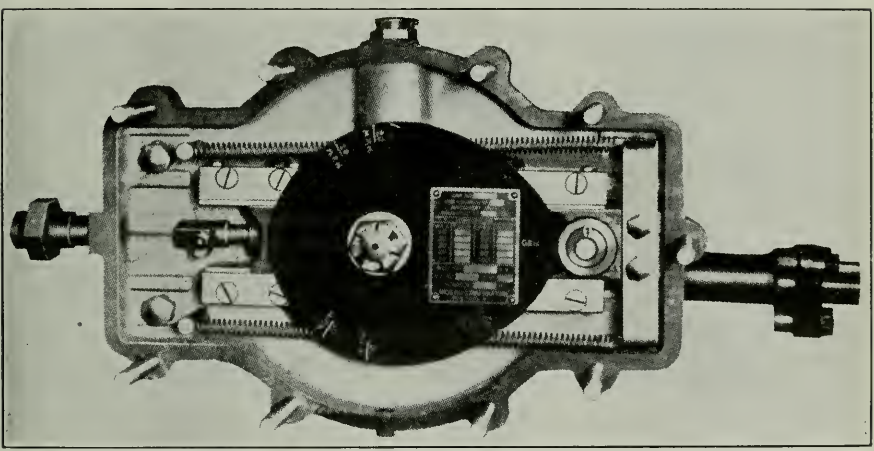


FIG. 6.—Interior of Cam Box.

based on locomotive characteristics and is so designed that if at any speed the reverse lever is manipulated to bring the cut-off hand line and line with the speed hand, the locomotive with full throttle will produce its maximum tractive force at that speed.

The instructions for its use are simple (Figures 9 and 9-A). For maximum hauling capacity keep the two hands together. For the greatest economy keep the cut-off hand as far in advance of the speed hand as possible, while maintaining the desired speed, taking care not to use a cut-off so short that the locomotive rides hard.

By analysis and classification the autographic records are used as a means of establishing correct standards of locomotive operation. By instructing the enginemen to follow the indications of the instrument the Road Foremen set the mark in the various classes of service and an analysis of the records of en-

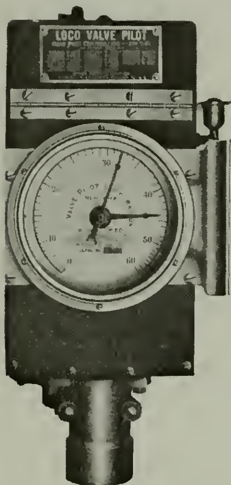


FIG. 7.—Exterior View of Instrument.

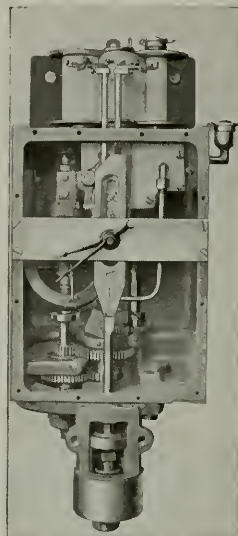


FIG. 8.—Interior View of Instrument Showing Tape Mechanism.

ginemen who have not been instructed furnishes a means of drawing lines between the varying degrees of efficiency of operation.

The first problem then in connection with the following up of locomotive operation in this manner has to do with the establishment of standards. Since there are two variables under consideration—man performance and locomotive condition—and since

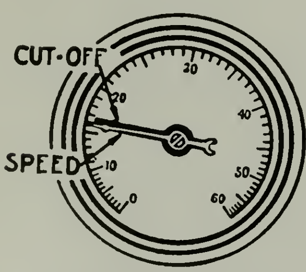


FIG. 9—Relation of Hands to Produce Maximum Tractive Effort.

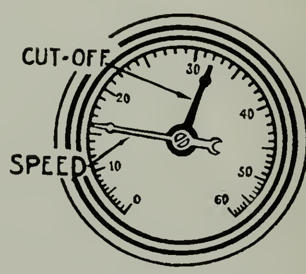


FIG. 9-A.—Relation of Hands to Produce Fuel Economy.

a single record is incapable of appraisement except when compared with other records under similar conditions of service, it would appear desirable to establish standards on the basis of man perfomance.

COMPARATIVE LOCOMOTIVE PERFORMANCE

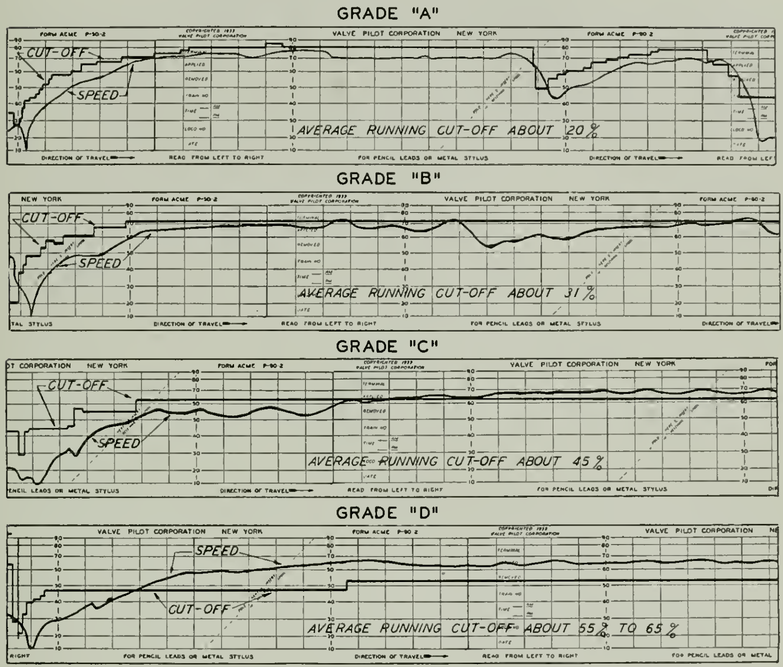


FIG. 10.—Typical Records for Use in Establishing and Classifying Standards of Locomotive Performance.

Figure 10 depicts a suggested method for setting up standards of operation in through passenger service. Grade "A" typifies excellent operation; Grade "B", good operation; Grade "C", fair operation; Grade "D", poor operation.

All records from all locomotives in this class of service are inspected and by comparison are classified into groups corresponding with the various grades of operation indicated by the established standards.

The first consideration of the supervisory officers are those men and locomotives falling into Grade "D" group, the second consideration are those in the Grade "C" group and the final consideration, those in the Grade "B" group. The ultimate object is to raise the average overall performance by lifting as many as possible out of the "B", "C" and "D" groups into the "A" group by a campaign of education among the men and by a closer attention to locomotive maintenance. The records immediately point out the spots where action is needed and as time goes on, subsequent records furnish positive proof that the action taken has been productive of results.

Once the standards are established, the records are forwarded to some central point for analysis and classification. By comparison with the established standards these records are grouped into two general classifications:

GROUP I. Those complying with the established standards which indicate that both locomotives and men are up to par and that no further supervision of motive power or of personnel in this group is immediately necessary.

GROUP II. Those which indicate apparent sub-standard operation and are returned through channels for investigation.

We say "apparent sub-standard operation" because it must be remembered that we are dealing with two variables—man performance and locomotive condition.

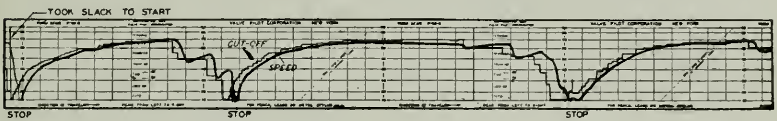
If the mechanical condition of a locomotive is below standard we cannot reasonably expect an A-1 job from the man operating it, no matter how good his record may have been with other locomotives. One of the advantages of having the records analyzed at a central point is that attention is quickly called to those locomotives whose records are below par, irrespective of the men who operate them. An analysis of a single record may indicate that the man is below par but a comparison of this record with other records from the same locomotive operated by different men under similar operating conditions may give us a lucid picture of locomotive condition which prevented the power from being operated in a manner other than was indicated.

On the other hand, if a locomotive produces a consistently good record when operated by a number of different enginemen but reveals sub-standard operation when in the care of certain other men it immediately becomes apparent that the latter require further instructions. Records made by the same men, subsequent to instruction, will indicate whether such instructions are absorbed and put into practice.

This method of following up locomotive performance increases the intensity of supervision over both men and locomotives without increasing the amount of work required of the Road Foremen, because it particularly directs their efforts to those locomotives in need of attention and to those enginemen in need of instruction.

ENGINE 2399 TRAIN 602 VALLEY DIVISION ENGINEER G---- FIREMAN S---- JUNE 22-1934

ESTABLISH A HIGH STANDARD OF PERFORMANCE



SAME ENGINE SAME TRAIN SAME LOCATION DIFFERENT CREW FIVE MONTHS LATER

MAINTAIN THE PERFORMANCE AT THE SAME HIGH LEVEL

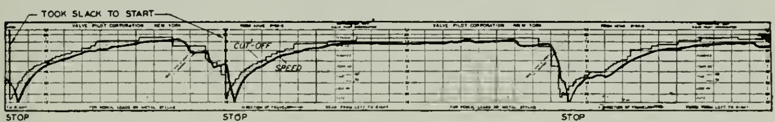
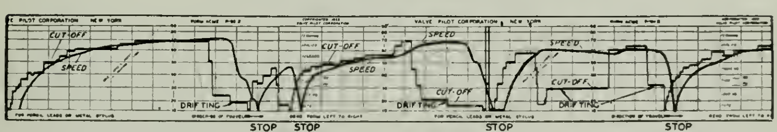


FIG. 11.—Reproduction of Valve Pilot Records Showing Uniformity of Performance Attained By Correctly Following Instrument Indication.

Figure 11 illustrates the uniformity of performance capable of attainment under this mode of supervision. The lower record was made five months later than the upper. Both records were

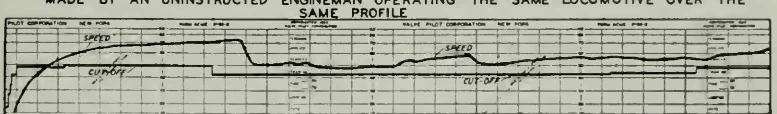
RECORD NO. 1

MADE BY AN INSTRUCTED ENGINEMAN



RECORD NO. 2

MADE BY AN UNINSTRUCTED ENGINEMAN OPERATING THE SAME LOCOMOTIVE OVER THE SAME PROFILE



OPERATION WITH LIGHT THROTTLE AND LONG CUT-OFF

FIG. 12.—Reproduction of Valve Pilot Records Showing Difference in Methods of Locomotive Operation by Different Enginemen Over the Same Profile.

taken from the same locomotive hauling the same train, but handled by different crews. By comparison with the established standard it is noted that in both instances the engine is in good mechanical condition and the two enginemen as well as the locomotive clearly belong to the Grade "A" group.

Figure 12 presents an interesting contrast between two methods of operation over the same people. Record No. 1 was made by an engineman who had been instructed to correctly follow instrument indication. The engineman producing Record No. 2 had not been so instructed, but followed his own judgment, operating with light throttle and relatively long cut-off.

Record No. 1 falls into Grade "A" group. Record No. 2 falls into Grade "D" group and indicates the need of instruction, assuming that other records made by the same locomotive operated by other enginemen show a substantial number of Grade "A" or Grade "B" performances.

On the other hand, if all or a substantial number of records taken from this locomotive were like No. 2, even when handled by men who turned in records similar to No. 1 from other locomotives of the same class, it clearly indicates that the mechanical condition of the locomotive is responsible for the less efficient mode of operation and the Motive Power Department can take steps to correct it. Until such time as the locomotive is in condition to properly and fairly compete with other engines of its class, the records are followed up from the standpoint of picturing condition of motive power and are eliminated from consideration as a measuring stick of man performance.

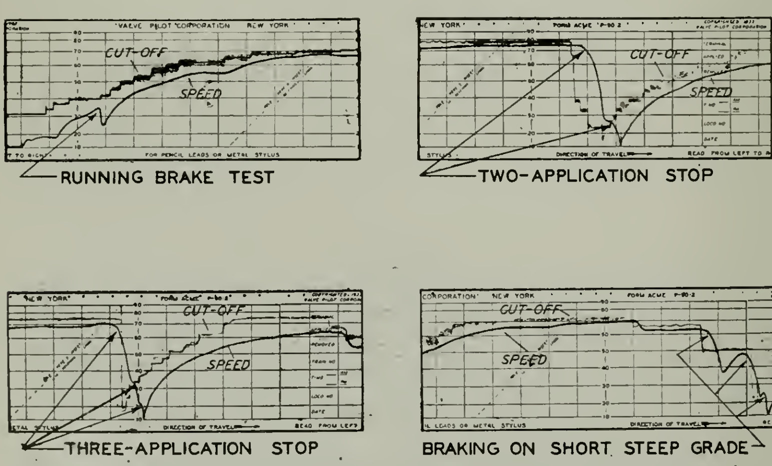
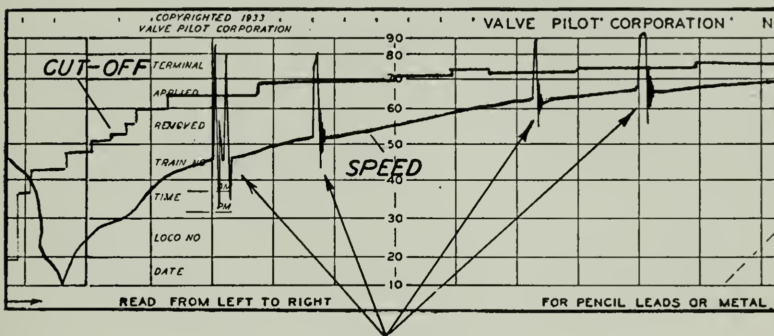


FIG. 13.—The Valve Pilot Records Present a Clear Picture of Brake Applications.

In addition to furnishing a story of locomotive condition and of the method of operation followed by each engineman the autographic records supply additional incidental information pertaining to locomotive performance which is helpful to operating and mechanical officers. For example the records in Figure 13 present interesting pictures of deceleration under various modes



SLIPPING DRIVERS

FIG. 14.—Reproduction of Valve Pilot Record Showing Slipping of Locomotive Drivers.

of braking and Figure 14 is a record of severe slipping of drivers which has been found to be a potential cause of rail damage particularly when occurring at high speed.

Locomotive operation achieved by instrument indication and followed up by autographic records is parallel in a general way to central station operation as will be noted from an analysis of the two diagrams in Figure 15.

Each unit of the central station is in charge of a supervisor who has charge of certain equipment and personnel. The performance of the equipment is indicated on the instrument panel and enables the chief engineer to keep a close watch over the operation of his power plant. The instrument indications are a guide to efficiency and if difficulty develops he can immediately correct it because its source is localized. The standard of performance is established by instrument indication and maintained at a high degree of efficiency by analysis of the autographic records produced.

Similarly each operating unit of a railroad has one or more road foremen of engines who are in charge of a designated group of locomotives and men. If each locomotive is equipped with an instrument guiding the engineman in its operation and producing autographic records which are sent to a central point for analysis and classification into standard and apparent sub-standard operation it enables the management to concentrate supervision where most needed because it localizes the source of difficulty and directs the activities of the road foremen into channels where there are greatest opportunities of producing increased efficiency.

The analysis of the records of locomotive performance in the central office corresponds to the interpretation and application of the indications in the instrumental panel of the power house. The instrument points the way to a high standard of efficiency and the autographic records are proof of its achieve-

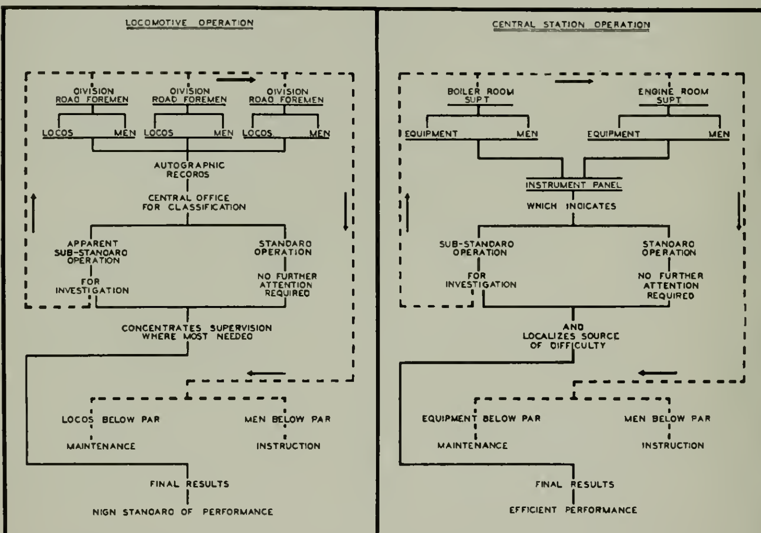


FIG. 15.—Locomotive Operation by Instrument Indication is Similar to Central Station Operation

ment by reason of furnishing a means of certified control of the performance of each locomotive.

It is a well recognized fact that effective supervision of locomotive performance more than pays its cost in fuel consumption, in fewer engine failures, in a lesser number of engines required —all of which represents definite monetary savings—and in numerous other ways which are not capable of direct financial evaluation. It is then apparent that equipment which simplifies and improves supervision and raises operating efficiency by making possible the achievement of correct standards of locomotive performance will more than pay its cost by reason of the operating economies which must inevitably follow its use.

PRESIDENT: I am sure any of us who have had anything do with the operation of a railroad appreciate the fact that while we are proud of the fine body of men we have on the railroads—and we think they are second to no other group of men in the industrial world—there are always some men and some equipment that are below par, and I am sure the paper we have listened to has aroused some thoughts in your minds. I am sure Mr. Davidson will answer any questions you may wish to ask.

MR. C. O. DAMBACH: I would like to ask Mr. Davidson if in the instruction of enginemen in connection with this device it will involve anything that is contrary to what is taught by the road foreman of engines.

MR. DAVIDSON: No it does not. We simply put it up to the engineman to follow the instructions of the Road Foreman by placing before him an instrument whose indications constantly give him the benefit of the Road Foreman's experience and knowledge of locomotive operation. The instrument in the cab is equivalent to having the Road Foreman ride every trip and the autographic record is equivalent to the Road Foreman's riding report. The instrument indication only asks the engineman to do those things which he has been taught by his Road Foreman and the record indicates whether he follows instructions.

PRESIDENT: Mr. M. R. Reed, General Superintendent of Motive Power, Pennsylvania Railroad, may we hear from you?

MR. M. R. REED: An invitation from the President is, of course, a command, and that is the reason I venture to speak.

I have heard it said that the railroad can only do what its locomotives can do, and sometimes we motive power men take pride in that statement and sometimes when the locomotive does not do so well we wish we were some place else. There is nothing more discouraging to a well organized division than to have a locomotive lose a couple of side rods or brake a valve gear or fail in steam, then lie down and die and upset the whole program. Then we wish we were any place else.

Seriously, we are interested in locomotive performance. As I look at it, locomotive performance can be measured from three different angles. First its efficiency as a transportation machine, without regard to maintenance cost or thermal efficiency an engine that can take the biggest train in the shortest possible time from here to there. Second, its performance measured by maintenance cost. And third, its thermal efficiency. I am wondering and I want to ask Mr. Davidson a question on this point, whether a locomotive operated strictly in accordance with the best practice as indicated by the Valve Pilot, would get the best performance from all those three angles, that is as a transportation machine, as an economical maintenance cost machine, and as an economical machine from the coal-water consumption standpoint, or thermal efficiency as you call it. I would like Mr. Davidson to give us a little advice on that point.

MR. DAVIDSON: The engineman utilizes the ultimate capacity of the locomotive as a transportation machine when he operates with the two hands of the Valve Pilot together. This is not the point of greatest fuel economy but it is the point of greatest ability to move trains over the road because, with the two hands together at any speed the locomotive is producing its maximum hauling capacity at that speed.

To secure the greatest economy in fuel the cut-off hand is advanced ahead of the speed hand as far as possible while still maintaining the desired speed. The amount of spread between the two hands is a measure of the economy obtained and will vary with the speed, the load and the grade. This relative position of the hands probably represents the point of most efficient heat transfer.

The function of the Valve Pilot with respect to locomotive maintenance is that of determining an index of locomotive condition by comparison and analysis of the autographic records from a number of locomotives operated by a number of different engineers. This method of analysis will point out those locomotives whose mechanical condition is not up to par although it may not directly indicate the exact cause of the difficulty. For example the tape record may show by the character of the cut-off line that unusual stresses are present in the valve motion. These stresses not readily discernible by the engineer may result from insufficient lubrication, from carbon accumulation or from shouldered bushings. While the record in this instance does not indicate the exact cause of the difficulty it does define the limits within which to look for the exact cause.

Does that answer your question?

MR. REED: Yes sir, you have answered it generally. As

I got it from the paper the thing of prime importance was that you got the maximum transportation. That was the first consideration, as a transportation machine. And it does not necessarily follow that the locomotive operated to produce the maximum of transportation would at the same time produce the maximum of economy in maintenance or fuel economy. That is the thing I wanted to bring out. I cannot talk of this device from experience for I have had no experience with the Valve Pilot and I know very little about it. The above is what I got from the paper and I wanted it clear in my mind, because there is not necessarily a relation between maximum transportation economy and that of maintenance and thermal efficiency. I think we naturally have to consider the machine from a transportation standpoint.

That being the case, another question comes to my mind. When you are not operating the locomotive at its maximum capacity there is a spread between the red hand and the black hand on the gauge. Just how is that spread determined, if there is a predetermination and instruction as to how wide those hands should stand apart when you do not have to develop maximum power. You showed on the screen a case where the speed hand was about 30 miles an hour and the other hand about 55. Is the 55 in proper relationship with the 30 under those conditions? How would you advise the engineman what their position should be when maximum conditions develop?

MR. DAVIDSON: In that particular case the maximum allowable speed for that train was 35 miles per hour and the train load and grade were such as would produce that speed without using the ultimate capacity of the locomotive as a transportation machine. The engineman simply shortened the cut-off to the point that would enable him to hold that speed. Should he approach a grade it would be necessary for him to bring the cut-off hand nearer the speed hand in order to compensate for increased resistance and to minimize the loss of speed on the grade. There is no definite relationship governing the spread between the speed hand and the cut-off hand, it is dependent on the grade, the load and the speed necessary to make the schedule. On the easier sections of the road the engineman simply keeps the cut-off hand as far in advance of the speed hand as he can to make top speed, taking care not to hook up so short that the engine rides hard and develops pounds in driving boxes and butt end brasses.

PRESIDENT: Does that answer your question you have in mind?

MR. REED: Generally, yes. There is still one other question. A man is going to operate his locomotive, his cut-off, to maintain a speed that is predetermined for his run. Is that correct?

MR. DAVIDSON: Yes.

MR. REED: Couldn't a man do that without a Valve Pilot? Can he do the same thing?

MR. DAVIDSON: No, not altogether. His estimate of speed may be in error to the extent of four or five miles or more and consequently his judgment in selecting cut-off may be in error to the same extent. If he knows exactly what speed he is making and the relationship of that speed to his schedule he can within the limitations imposed by load and grade adjust the cut-off to either maintain that speed, increase it, or decrease it as his schedule requires. In being able to accurately adjust cut-off to speed he is in a better position to increase the efficiency of his locomotive as a transportation machine when such increase is demanded or when not demanded to produce the required transportation with a minimum of fuel.

MR. REED: In other words he has something definite to supplement his judgment.

MR. DAVIDSON: Yes, sir.

PRESIDENT: Mr. Karl Berg, Superintendent of Motive Power, Pittsburgh & Lake Erie, have you any comment to make?

MR. KARL BERG: During the limited time I have been directly interested in the Valve Pilot Device, must say I have found it a very interesting and useful instrument. There are a number of advantages in connection with this instrument that cannot be observed at first—at least they are not as apparent as they become later on.

While they are not difficult to understand, the points of advantage affect the various phases of operation to a much greater extent than you first suspect. I am not at present in position to talk authoritatively about these advantages as we have not used the device long enough with reference to the charts. However, as explained on the screen I wish to ask the question how it is possible to determine from the reading of these charts why in the case of a poor chart, whether the fault lies with the locomotive or the man who operates it. That is a very interesting point, and if it is possible to go into the matter in more detail, I will be glad to have you do so.

MR. DAVIDSON: This method was first worked out on a railroad which began with an experimental application of five Valve Pilots in passenger service. No attempt was made at first to instruct all enginemen systematically in the proper use of the equipment because the same man had a Valve Pilot engine at infrequent intervals only. However, the records afforded an excellent opportunity to study the methods used by different enginemen in the selection of cut-off when guided by their judgment and previous experience alone.

The performance records were forwarded to the office of the fuel department for analysis and classification by operating divisions. From these first records four typical methods of operation respecting the selection of cut-off at running speed were established as a measuring stick of locomotive performance. These were designated as Grades "A", "B", "C" and "D" as shown in Figure 10. Even though these selections were made largely on the basis of economy, it was found that while the Grade "A" engineman operated with economy he also made better use of the reverse lever in accelerating from stops and slowdowns.

On following up the records it was found that certain enginemen were turning in consistently good records day after day and certain other enginemen were rather consistent in producing records of a lower standard of performance. Card records were made of each engineman and on these cards was entered the record of the character of operation used by each man. On another card was carried along a record of the locomotives as handled by different enginemen.

If, for example, the record of a given locomotive indicated a high standard of performance on the first and third divisions of a run and poor performance on the middle division, the prior record of the man handling the engine on the middle division was looked up and it was usually found that he was a consistent Grade "C" or Grade "D" operator and needed instruction.

On the other hand it might be found that a certain locomotive was consistently producing records of inferior performance even when handled by men who turned in high class records on other locomotives. This definitely indicated that the locomotive required attention.

When the application of Valve Pilots was later extended to the entire class of locomotives the same method of analysis of the records was continued and is still used to definitely place the responsibility on the mechanical condition of the locomotive or on the mode of operation used by the engineman for failure to adhere to the established standards of good performance.

PRESIDENT: Does any one else wish to say anything about the paper? I will say this, that this has been one of the most interesting discussions we have had of a paper in recent months and I would be very glad if we had time this evening to go into it farther, but the hour is growing late. Tonight we have registered 146 members and 22 guests, a total of 168, and if it were not for the busy season we would have had a great many more present. A lot of our fellows have to work tonight.

Mr. Dambach, will you add any comment?

MR. C. O. DAMBACH: When I came here tonight I thought this would be a mechanical man's paper, and being raised in the transportation department I thought I would be out of order. Since Mr. Davidson has demonstrated that it is a transportation machine, I can readily appreciate the advantage of anything that achieves results and takes responsibility from the man to the engine. If we are successful in fixing that responsibility, it is comparatively easy to increase efficiency enough to pay substantial returns on the cost of this new device.

I think we are very much indebted to Mr. Davidson for his very interesting discussion of a very interesting machine. I think we know a lot more about it than we did when we came into this room. I would move a rising vote of thanks to Mr. Davidson for the able paper he has presented here tonight.

PRESIDENT: Before putting that motion to vote I would like to introduce Mr. Wm. Bell Wait, President of the Valve Pilot Corporation. He was a visitor until 3:30 o'clock this afternoon when he became a member of the Club, and we would like to hear from him.

NOTE: Mr. Wait made a delightful response, full of both wit and wisdom, adding some interesting information to the discussion, but at his special request his words are not printed.

PRESIDENT: We are ready at the ends of the room to serve the collation. I want to say that the Railway Club of Pittsburgh wishes you a merry, merry Christmas and a happy new year. We are now ready for a vote on the motion.

The motion prevailed by unanimous rising vote.

PRESIDENT: If there is no further business, the meeting will stand adjourned.

J. D. CONWAY, Secretary.

In Memoriam

H. S. TARR

Joined Club September 26, 1929

Died June 1, 1934

H. M. RIEKER

Joined Club October 25, 1928

Died December 17, 1933

F. J. NANNAH

Joined Club October 25, 1925

Died December 11, 1934

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OF

The Railway Club of Pittsburgh

Organized October 18, 1901

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Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 3

Pittsburgh, Pa., Jan. 24, 1935

$1.00 Per Year
25c Per Copy

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INDEX—ADVERTISERS.

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*F. H. STARK	November, 1905, to October, 1907
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*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
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LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
JANUARY 24, 1935

The meeting was called to order at 8 o'clock, P. M., at the Fort Pitt Hotel with President R. H. Flinn in the chair.

Registered attendance, 313, as follows:

MEMBERS

Adams, Frank W.
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Ament, F. C.
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Barr, S. T.
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Carr, John S.
Carr, T. W.
Carroll, D. C.
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Christy, F. X.
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Connolly, R. D.
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Coombe, A. B.
Cotter, G. L.
Crawford, A. B.
Cunningham, J. D.
Cunningham, J. L.
Cunningham, R. I.
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Dihle, J. E.
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Emery, E.
Endsley, Prof. Louis E.
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Glenn, J. H.
Goda, P. H.
Goldstrom, Gus
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Guinnip, M. S.
Haller, Nelson M.
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Harper, J. T.
Hemma, Charles H.
Hepburn, P. W.
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Herrold, A. E.
Hilbert, R. F.
Hilstrom, A. V.
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Holsinger, Frank
Honsberger, G. W.
Hook, Charles H.
Hoover, J. W.
Horne, John S.
Huber, H. G.
Hunt, Lawrence
Hykes, N. H.
Johnson, Ira S.
Johnson, J. W.
Kane, H. S.
Kaup, H. E.
Keck, L. M.
Kerr, Charles, Jr.
Kirk, W. B.
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Knoff, R. A.
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Wilson, W. S.
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Winslow, S. H.
Woods, G. M.
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Wright, Edward W.
Wurts, T. C.
Wynne, F. E.
Weaver, W. Frank
Yarnall, Jesse
Yeardley, Harry

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Mauzey, Paul H.
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Mooney, R. J.
Munro, George
McChesney, V. A.

McKinley, Joseph
Olsson, F. J.
Ostrom, H. W.
Oyen, Finn
Pavlik, George
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Payne, H. A.
Quinn, J. J.
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Reynolds, D. E.
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Schrontz, S. B.
Severn, H. A.
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Shepherd, W. B.
Sherron, John
Smith, Sion B.
Snitehurst, J. H.
Stevenson, W. M.
Stewart, C. D.
Stults, D. W.
Swanson, A. P.
Terkelsen, B.
Topping, John
Travis, C. B.
Vollmer, Paul J.
Wallace, A. M., Jr.
Watson, A. J.
Waxler, Brice
White, W. B.
Yancey, P. E.

As has become the custom, a musical program preceded the business meeting, in which the newly organized Quartette and Chorus of the Railway Club of Pittsburgh took the prominent parts.

The call of the roll was dispensed with, the registry cards furnishing a full and complete record of attendance.

By common consent the reading of the minutes of the last meeting was dispensed with.

PRESIDENT: The minutes of the last meeting are in print and the printed Proceedings will reach you early next week. It is our intention to have the Proceedings in the hands of the membership each month before the next meeting of the Club. The December issue was somewhat delayed, from causes beyond our control, but hereafter we expect to live up to our schedule.

We have the following list of proposals for membership. I will ask the new members to stand as their names are read, that we may recognize them and welcome them into the Club.

Adams, Charles E., Superintendent, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. C. Miller.

Anderson, H. N., Assistant Engineer Maintenance of Way, B. & O. R. R., 109 Cedar Boulevard, Mt. Lebanon, Pittsburgh, Pa. Recommended by T. E. Britt.

Armstrong, Joseph G., Jr., Assistant to Manager of Sales, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by A. B. Severn.

Bradley, Howard J., Field Engineer, Monongahela Railway Company, 556 Pearl Street, Brownsville, Pa. Recommended by D. K. Orr.

Bucher, Fred J., Electrical Engineer, Hillman Coal & Coke Company, 249 Jonquil Place, Mt. Lebanon, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Burkhart, A. E., Foreman Car Department, Pennsylvania Railroad, 760 Woodlawn Road, Steubenville, Ohio. Recommended by W. B. Moir.

Buzzard, J. P., Signal Supervisor, B. & O. R. R. Co., 318 Rochelle Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Carlson, H. E., Transitman, P. & L. E. R. R., 700 Eighteenth Avenue, Beaver Falls, Pa. Recommended by J. R. Barclay.

Cochran, Harry A., Traffic Manager, A. M. Byers Company, Clark Building, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Cosgrave, L. D., Assistant District Sales Manager, Gulf Refining Company, Pennsylvania Apartments, Center Avenue, Pittsburgh, Pa. Recommended by J. D. Conway.

Cross, J. H., Coal and Ore Agent, Pennsylvania Railroad, Union Trust Building, Cleveland, Ohio. Recommended by G. M. Sixsmith.

Cushman, P. J., Foreman Car Department, Pennsylvania Railroad, 87 Bradford Avenue, Crafton, Pittsburgh, Pa. Recommended by W. B. Moir.

Downing, J. A., District Freight Claim Agent, Pennsylvania Railroad, 1013 Penn Avenue, Pittsburgh, Pa. Recommended by E. A. Foard.

Dunn, J. W., Foreman Mechanical Department, B. & O. R. R. Co., 244 Trowbridge Street, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Egbert, J. A., President, Railway Products Company, Gulf Building, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Egly, M. J., Chief Clerk to General Manager, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by E. A. Foard.

Finegan, Thomas A., Wreck Foreman, Pennsylvania Railroad, Conway, Pa. Recommended by W. B. Moir.

Fitzpatrick, T. R., Freight Traffic Manager, P. & L. E. R. R., Terminal Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Forsythe, G. B., Foreman Car Department, Pennsylvania Railroad, Baden, Pa. Recommended by W. B. Moir.

Goldstrom, G. E., Draftsman, P. & W. Va. Ry. Co., 1305 Highman Street, Pittsburgh, Pa. Recommended by C. O. Dambach.

Haggerty, J. F., General Foreman, B. & O. R. R. Co., 1602 Chelton Avenue, Brookline, Pittsburgh, Pa. Recommended by T. E. Britt.

Hansher, W. E., Mechanical Representative, Hennesey Lubricator Company, 245 East King Street, Chambersburg, Pa. Recommended by T. E. Britt.

Helfrich, F. A., Chief Electrician, B. & O. R. R. Co., 404 Olympia Road, Pittsburgh, Pa. Recommended by T. E. Britt.

Hicks, W. A., Vice President, Penn Iron & Steel Company, Creighton, Pa. Recommended by Charles J. Nieman.

Higgins, George A., Assistant Manager of Sales, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by A. B. Severn.

Hodges, A. H., District Master Mechanic, B. & O. R. R. Co., 3100 Gaylord Avenue, Dormont, Pittsburgh, Pa. Recommended by T. E. Britt.

Holsinger, Frank, Gang Foreman, Pennsylvania Railroad, 557 Fourth Avenue, Freedom, Pa. Recommended by W. B. Moir.

Hughes, L. H., Supervisor, Eastern Demurrage & Storage Bureau, Pennsylvania Railroad, 427 Vermont Avenue, Rochester, Pa. Recommended by G. M. Sixsmith.

Hunter, B. F., Chief Lubricating Engineer, Gulf Refining Company, Gulf Building, Pittsburgh, Pa. Recommended by A. J. Bessolo.

James, J. H., Purchasing Agent, P. & L. E. R. R. Co., Pittsburgh, Pa. Recommended by Herbert J. Watt.

Keck, L. M., Agent, Junction Transfer, B. & O. R. R. Co., Liberty Avenue and Thirty-second Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Knable, G. Elkins, Manager, Bureau of Inspection and Tests, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by C. W. Rys.

Knoke, H. C., Secretary to District Master Mechanic, B. & O. R. R. Co., 1518 Kelton Avenue, Dormont, Pittsburgh, Pa. Recommended by T. E. Britt.

Machin, Norman H., Gang Foreman, Pennsylvania Railroad, 359 Reno Street, Rochester, Pa. Recommended by W. B. Moir.

Mahaney, A. R., Transportation Apprentice, Pennsylvania Railroad, Amber Club, 5920 Wellesley Avenue, Pittsburgh, E. E., Pa. Recommended by G. M. Sixsmith.

Marble, Robert A., Structural Engineer, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Metzger, Frank K., Vice President, Standard Steel Works Company, Burnham, Mifflin County, Pa. Recommended by Herbert J. Watt.

Miller, W. J., Storekeeper, Pennsylvania Railroad, 349 Moyhend Street, Springdale, Pa. Recommended by G. M. Sixsmith.

Mowry, John W., Salesman, Scully Steel Products Company, 1281 Reedsdale Street, Pittsburgh, Pa. Recommended by A. B. Severn.

Musgrove, W. W., Piece Work Inspector, P. & L. E. R. R., Box 301, Glenwillard, Pa. Recommended by A. V. Hilstrom.

Newman, S. A., Assistant District Sales Manager, Gulf Refining Company, Cathedral Mansions, Ellsworth Avenue, Pittsburgh, Pa. Recommended by A. E. Brice.

Powell, H. C., Assistant Foreman, Car Department, Pennsylvania Railroad, 362 Ohio Avenue, Rochester, Pa. Recommended by W. B. Moir.

Powell, Lloyd G., Erection Foreman, B. & O. R. R. Co., 827 Rossmore Avenue, Brookline, Pittsburgh, Pa. Recommended by T. E. Britt.

Read, A. A., Duquesne Slag Products Company, Diamond Bank Building, Pittsburgh, Pa. Recommended by R. H. Flinn.

Sarchet, Roger, Chief Clerk, Labor and Wage Bureau, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by E. A. Foard.

Smith, Gilbert M., Gang Foreman, Pennsylvania Railroad, 376 Pennsylvania Avenue, Rochester, Pa. Recommended by W. B. Moir.

Stewart, J. D., Asst. Superintendent Rolling Mills, Jones & Laughlin Steel Corporation, 27th and Carson Streets, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Stone, Lauson, Assistant to President, Jones & Laughlin Steel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Troxell, Henry K., Railroad Sales Department, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by John C. Dilworth.

Watt, R. Nevin, Sales Manager, Standard Steel Works Company, Burnham, Mifflin County, Pa. Recommended by Herbert J. Watt.

Wilkoff, Louis E., Vice President, Youngstown Steel Car Corporation, Box 268, Niles, Ohio. Recommended by Herbert J. Watt.

Wilt, Howard H., Sales Representative, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by R. E. Maxwell.

Yeardley, H., Gang Foreman, Car Department, Pennsylvania Railroad, 2662 Center Street, Ingram, Pittsburgh (5), Pa. Recommended by W. B. Moir.

The next order of business is Reports of Committees. Owing to the very full program this evening and the fact that the Committees have been so recently re-organized, I will excuse them from making reports tonight, but I will read a summary of the membership as furnished me by the Secretary. We will have a very complete analysis at our next meeting.

You will remember that we started the fiscal year with 746 members at the October Annual Meeting. We have received at the last two meetings 239 new members and reinstated 16. There have been 10 resignations, 2 lost addresses and 4 deaths, a reduction of 16, leaving a net membership of 985. With the 54 applications approved at this meeting we now have a membership of 1,039. You will remember we said in November that we would have 1,000 paid up members at the January meeting. Here we are. I think the Membership Committee deserves a great deal of credit for this splendid result and I wish to pay my respects to Mr. Watt and the members of his Committee.

The new Advertising Committee, which I will now announce, has not had opportunity to formally organize, of course, but I know that they are actively started on their work. I will read the names of the members of this Committee, and also the additional members of the Reception and Membership Committees authorized by action of the Club at the last meeting:

Advertising Committee:

E. A. Foard, (Chairman), Superintendent Stations and Transfers, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa.

Karl Berg, Superintendent Motive Power, P. & L. E. R. R. Co., McKees Rocks, Pa.

H. E. Passmore, Representative, Hanna Stoker Company, 5668 Darlington Road, Pittsburgh, Pa.

Membership Committee:

Thomas R. Fitzpatrick, Freight Traffic Manager, P. & L. E. R. R., Pittsburgh, Pa.

William R. Gellatly, President, Superior Railway Products Company, Pittsburgh, Pa.

P. W. Hepburn, Sales Engineer, Gulf Refining Company, Pittsburgh, Pa.

W. B. Moir, Chief Car Inspector, Pennsylvania Railroad, Pittsburgh, Pa.

C. W. Trust, Assistant Traffic Manager, Carnegie Steel Company, Pittsburgh, Pa.

C. M. Wheeler, Sales Engineer, Union Switch & Signal Company, Swissvale, Pa.

Reception and Attendance Committee:

J. D. Beltz, Superintendent, B. & O. R. R. Co., Pittsburgh, Pa.

J. W. Hoover, Chief Traffic Dispatcher, Carnegie Steel Company, Pittsburgh, Pa.

J. W. Johnson, City Manager, Railway Express Agency, Pittsburgh, Pa.

A. A. Read, Duquesne Slag Products Company, Pittsburgh, Pa.

C. P. Schrecongost, Traffic Manager, Hillman Coal & Coke Company, Pittsburgh, Pa.

J. C. Shingledecker, Supervisor of Service Stations, The Pennzoil Company, Pittsburgh, Pa.

Mr. Secretary, are there any communications?

SECRETARY: There are no communications. You may be interested to know that there are 313 present at this meeting.

PRESIDENT: I want to congratulate the Reception and Attendance committee. It is a very cold night and the streets are very icy, and there is also a great deal of sickness, but it is very gratifying to see so many here tonight.

To refresh your recollection I will read the action on delinquent dues taken at the November meeting.

"WHEREAS, owing to severe financial stress during the past several years, many of our members have not paid their annual dues and are now delinquent and subject to suspension, and

WHEREAS, these delinquent members may be lost to the Club unless some prompt action is taken;

NOW, THEREFORE, BE IT RESOLVED, that all membership dues remaining unpaid for the year 1933 and previously be cancelled and further that any now delinquent member will be restored to good standing and have his unpaid 1934 dues cancelled upon payment of 1935 dues, which are now payable, providing such member avails himself of this special privilege before the January, 1935, meeting."

When that Resolution was passed it was our hope that we would restore to good standing a good many of our members who have drifted away and accumulated a lot of unpaid dues. It is particularly pertinent in view of the conditions we have been going through in the last few years. A great many of the members have come in under that Resolution, but owing to the fact that the Membership Committee has not been able to reach all the delinquent members to take advantage of that Resolution, they make the request that the time limit be extended from the January, 1935, meeting to the February, 1935, meeting, and the Executive Committee has authorized that action provided it is approved by vote of the Club. I would therefore suggest that a motion be made extending the time for members to avail themselves of the benefits of that Resolution from the January, 1935, meeting to the February, 1935, meeting.

ON MOTION, duly seconded and carried by unanimous vote, the time limit was extended accordingly.

PRESIDENT: Is there anything further, Mr. Secretary?

SECRETARY: Nothing more.

PRESIDENT: That brings us to the paper of the evening. We have been particularly fortunate on this occasion in selecting and securing the services of such a competent speaker as we have this evening, on such a particularly appropriate subject and one that has been given a great deal of publicity in the mechanical and technical papers and in the public press and undoubtedly a thing that is in the public eye at the present time, the recent development of high speed, light weight, streamlined trains on the railways of the country. The Union Pacific Railroad is the pioneer in that development and we have with us Mr. A. H. Fetters, General Mechanical Engineer, Union Pacific System, Omaha, Nebraska, who will present a paper on the subject "The Union Pacific System High Speed Light Weight Streamlined Trains." I take great pleasure in introducing to you Mr. Fetters.

THE UNION PACIFIC HIGH SPEED LIGHT WEIGHT STREAMLINED TRAINS

By MR. A. H. FETTERS, General Mechanical Engineer, Union Pacific System, Omaha, Nebraska

Gentlemen:

As a representative of the Union Pacific System I can sincerely tell you that I am happy and honored to be your guest, to accept your hospitality and to open the discussion on the subject for the evening.

In this historic center of development of air brakes, aluminum fabrication, alloy steels, electrical equipment, etc., it is a pleasure to acknowledge the contribution of these industries to the development of the high speed streamlined trains.

Recently a six car rail train, approximately equal in weight to 100 Cadillac cars, crossed the continent from Los Angeles to New York in 57 hours with a total fuel cost equal to that of one Cadillac making the same trip. To be more specific the main engine used $70.00 worth of fuel to make this 3,250 mile run. With 124 passengers aboard, the fuel cost per passenger carried is 60 cents as compared with $10.00 per passenger in the Cadillac. A fair approximation of cost of fuel for a steam train of five cars and a locomotive would be around $375.00.

While the Diesel engine on this train develops 900 HP, the average power factor for the trip was but 54%.

Having been a designer and builder of the steam locomotive for over 40 years, and with 30 years experience with internal combustion rail motor cars, I cannot help but project this remarkable performance forward, and visualize the future of Diesel rail transportation. Its possibilities are very great in economy, speed, cleanliness, reliability, and utilization.

Every new development has its background.

Just 30 years ago, the late E. H. Harriman, through whose efforts the Union Pacific had been taken out of receivership and reorganized upon a sound financial basis; authorized the building of Union Pacific rail motor car No. 1 propelled by a gasoline engine. This was the forerunner of the McKeen Motor Car industry which followed that period under Mr. Harriman's guidance. This was before the day of the electric drive, and mechanical transmissions were used.

Nevertheless, nearly 150 of these cars were built and successfully operated on many roads. Some of these early cars are still in operation with mileage records from 1 to 2 million miles.

Then came the era of the gas-electric rail car with its greater flexibility of operation and demonstrated economy over small steam trains in branch line operation.

It is more than coincidence, then, that Mr. W. A. Harriman, son of E. H. Harriman, and now Chairman of the Board of Directors, Union Pacific System, authorized, in the fall of 1932, a thorough research in the entire field of light weight materials of construction, streamlining, high speed trucks, Diesel engines, electric and other transmissions, and related subjects.

As early as 1926, Mr. W. A. Harriman sent your speaker to Europe to investigate the development of Diesel engines and transmission systems as applied to rail service, but, while many interesting projects were either being tried or suggested, two pertinent facts were apparent. First; that Europeans were mostly experimenting with Hydraulic, Pneumatic, and Mechanical forms of transmission, and second; notwithstanding the advancement of Diesel engine design at that time by such builders as M.A.N. Krupp, Fiat Burmeister & Wain, Sulzer, Beardsmore, there was no perfected and proved type of Diesel engine having the light weight, flexibility, reliability, and other necessary characteristics for light weight, high speed trains, either abroad or at home.

The research of 1932 disclosed a more fertile field in this respect. Also a progressive railroad, for once, looked over the fences of convention and conviction, into the garden-patch of other and newer industries. And thus, gentlemen, we pay acknowledgement to the Automotive and Aeronautical industries, and their enthusiasm in helping to apply the pertinent elements of their sciences to this new railway project.

As a result of this research, in May, 1933, an order was placed with Pullman Car & Mfg. Corporation for a 3-car train featuring light weight aluminum alloy construction, articulation, radical streamlining, powered with a 600 H.P. Winton distillate burning, spark ignition engine, and capable of safe speeds of 90 to 110 miles per hour.

Union Pacific Six Car Articulated Pullman Equipped Unit High-Speed Train, built of Aluminum and Driven by a 900-hp. Diesel Engine.

Through the medium of the press, the radio, and the films, you are more or less familiar with what followed.

Briefly, in February, 1934, this first train was delivered and after short break-in runs, went to Washington, D. C., for a preview by the President. After a 13,000 mile tour of test and inspection, it was placed on exhibit at the Century of Progress. It was also given a series of high speed acceleration and braking tests between Grand Island and Columbus, Nebraska, some results of which are reserved for later discussion.

Quite recently, further tests have been conducted in regard to minor adjustments and resulting in further refinements of performance.

The first train has thus been used as a traveling laboratory in order to work out and apply to the following high speed trains, some details that could only be settled by actual experience in the same manner that new automobile models are sometimes worked out on the proving grounds.

While the balanced speed of this first train is about 90-91 miles per hour, speeds of 110 M.P.H. have been recorded during routine test runs, with condition of grade and wind favorable.

This No. 1 or 3-car train has just been placed in revenue service between Kansas City and Salina, Kansas, making daily round trips of 374 miles. Its service weight is 98 tons.

Last October, the second high speed train was delivered by the Pullman Company. It consists of 6 cars, including the power car, one mail and baggage car, 3 Pullman sleepers of novel construction, and the rear buffet coach.

It embraces the same general construction as the first train and weighs 210 tons serviced with fuel, water, etc., but excluding pay load. It is powered, however, with the Winton 900 H.P. Diesel engine for propulsion and a Winton 120 H.P. auxiliary Diesel engine which generates power for lighting, air conditioning, blower fans, battery charging, and other auxiliaries. After several tuning-up runs, this train was taken to Los Angeles and on October 22nd started its record breaking coast to coast run of 56 hours 55 minutes.

Incidentally, this was not an attempt for a speed record, but was for the purpose of checking the proposed 39 hour schedule from Los Angeles to Chicago, with a continuation to New York City over the New York Central Railroad on their 20th Century schedule of 18 hours. Had maximum speed been the object of the run, 50 hours appeared feasible.

After reaching New York the train was exhibited in the principal eastern cities.

The best previous transcontinental run was 71 hours from San Francisco to New York in 1906 by the E. H. Harriman Special. The best through schedule at present is 77 hours.

During the test run of the streamliner, fuel was taken en route at Salt Lake City, Cheyenne, Omaha, and Chicago. Through the use of a special electric pump, the fueling rate is 100 gallons per minute, so that fuel stops averaged from 4 to 6 minutes each. The fuel capacity is 800 gallons, and a total of 2,079 gallons of fuel oil was used for both main and auxiliary engines, train heating and cooking, the distance being 3,250 miles, and the fuel rate 1.56 miles per gallon. At 4 cents per gallon this is equivalent to a cost of 2.56 cents per mile.

The highest recorded speed was 120 M.P.H. for a distance of 2 miles, 108 M.P.H. for 18 miles, and 83 M.P.H. for the 507 miles between Cheyenne and Omaha on the Union Pacific, all of which are records for rail speed. The balanced speed of this 6-car train is somewhat higher than for the 3-car train, approximately 95 M.P.H.

Two additional high speed trains each having 9 revenue cars, and with increased horsepower, are now under construction for the Union Pacific at the Pullman Plant and when finished are intended for service, one between Chicago and Los Angeles and one between Chicago and San Francisco, while the second, or 6-car train, is intended for service between Chicago and Portland, Oregon. Each of these runs is approximately 2,300 miles in length. The schedules will be under 40 hours.

That, in brief, is the outline of the high speed train project at present. Let us now review some reactions that have occurred on other railways and among the builders in the brief time since the Union Pacific trains were first announced.

Proposals for light weight, high speed trains, using special forms of streamlined steam locomotives, have appeared in print from the Baldwin Locomotive Works, American Locomotive Company, Lima Locomotive Company, and the Bethlehem Steel Company. These proposals all include light weight streamlined cars. There seems to be no difference of opinion on that end of it. Among the railways considering these steam proposals are the Milwaukee, which recently ordered two special high speed steam locomotives from the American Locomotive Company; the Baltimore & Ohio, which has recently finished a special high pressure steam locomotive for one of their announced high speed, light weight streamlined projects.

In the Diesel field we find the Chicago, Burlington & Quincy 3-car "Zephyr" following the Union Pacific train; the New Haven aluminum 3-car train being built by Goodyear Zeppelin Company; The Illinois Central, which has just placed an order with Pullman Company for a 5-car articulated streamlined train of 1200 Diesel H.P. for service between Chicago and St. Louis; the Baltimore & Ohio, which will purchase and test out an 1800 H.P. Diesel electric locomotive in high speed train service; the Santa Fe, which is reported to have purchased a 3600 H.P. Diesel electric locomotive for experimental service in pulling "The Chief"; the Boston & Maine 3-car train by the Budd Company, powered with a Winton Diesel engine, and the Gulf, Mobile & Northern train by American Car & Foundry Company.

Exterior, Etc.

Assuming that you are familiar with the exterior appearance of the U.P. trains, and that you have seen one or both trains either at the Century of Progress, or on exhibit in Pittsburgh or elsewhere, no attempt will be made to describe the exterior, except to comment upon the clean cut and rather advanced streamlining which is apparent at a glance, and the colors chosen for the purpose of maximum visibility under all conditions as well as pleasing harmony. No attempts were made to produce odd effects, but the train is merely an enlargement of the ultimate model which showed the minimum wind drag in the wind tunnel tests. The front and rear ends approximate the tear drop form. The skin surface is kept comparatively smooth by close attention to closures between cars, flush windows and doors, etc.

Floor Plans

The floor plans of both trains are also a matter of common knowledge, and were laid out to meet specific traffic requirements, bearing in mind that the second train includes sleepers and meal facilities for long runs of 2,300 miles or more. The 3-car train seats 116 passengers in the two coaches and has provision in the head or power car for baggage, mail and express. The 6-car train seats 56 coach passengers, and provides Pullman accommodations for 68 passengers, a total of 124 passengers, and carries a combined mail and baggage car.

Dimensions, Weights, Etc.

The general dimensions of the two trains are as follows:

Length, 3-car train—204 ft., Service Weight—197,000 lbs.

Length, 6-car train—376 ft., Service Weight—420,000 lbs.

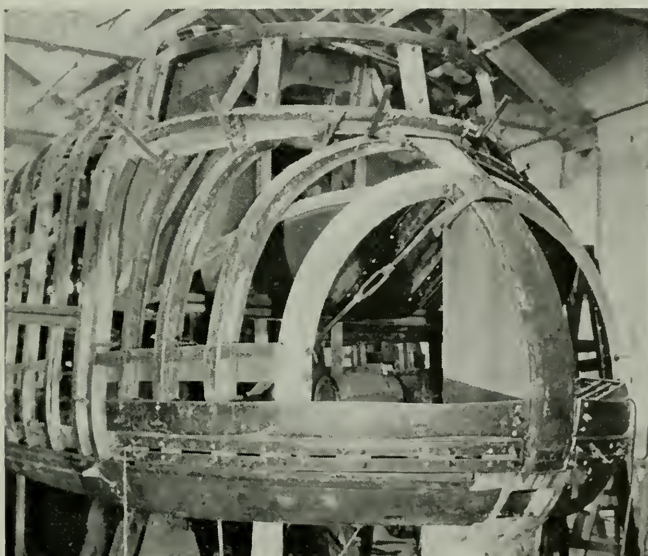
Cross section, tubular, 9 ft. extreme width, 11 ft. rail to roof, bottom of tube above rail 9½″ with a cut out at each end of each car for trucks. Floor above rail 3 ft. or 16″ lower than steam trains. Center of gravity of coaches and sleepers 38″ to

Interior View Showing the Seating Arrangement in the Cars.

40″ above rail. Center of gravity power cars 48″ above rail. The center of gravity of the average passenger steam locomotive is 66″ to 70″ above rail, and the average sleeping car 60″ above rail. Hence the practical value of these low centers of gravity is apparent in permitting higher safe speeds on curves without disobeying the established rule to keep the overturning moment always within the middle third of the track gauge.

Structural Features

The car bodies are composed largely of two principal structural elements, namely aluminum alloy extruded shapes of appropriate sections, in combination with aluminum alloy plates. These two structural elements are combined to form the car bodies by a novel technique developed by the car builders which permits, where convenient, an interlocking of the structural members whereby they are allowed to take their stresses more directly than if depending upon riveting entirely. In this manner the full stress value of the extruded sections is taken advantage of, and material is saved. The result is a strong, rigid



Typical Massive Aluminum Framing Construction at the Front of the Train.

tubular truss to resist vertical and transverse stresses, and also having a high ratio of strength to impact. That is, the material approximates mild steel in strength while the weight of aluminum is about one-third that of steel.

That deflection can be reduced in aluminum alloy car structures was demonstrated by the fact that when these car bodies were removed from the jigs and supported at ends only, the total deflection was 1/16 inch, while the usual conventional steel car body goes down from 3/16 to 1/4 inch under the same conditions.

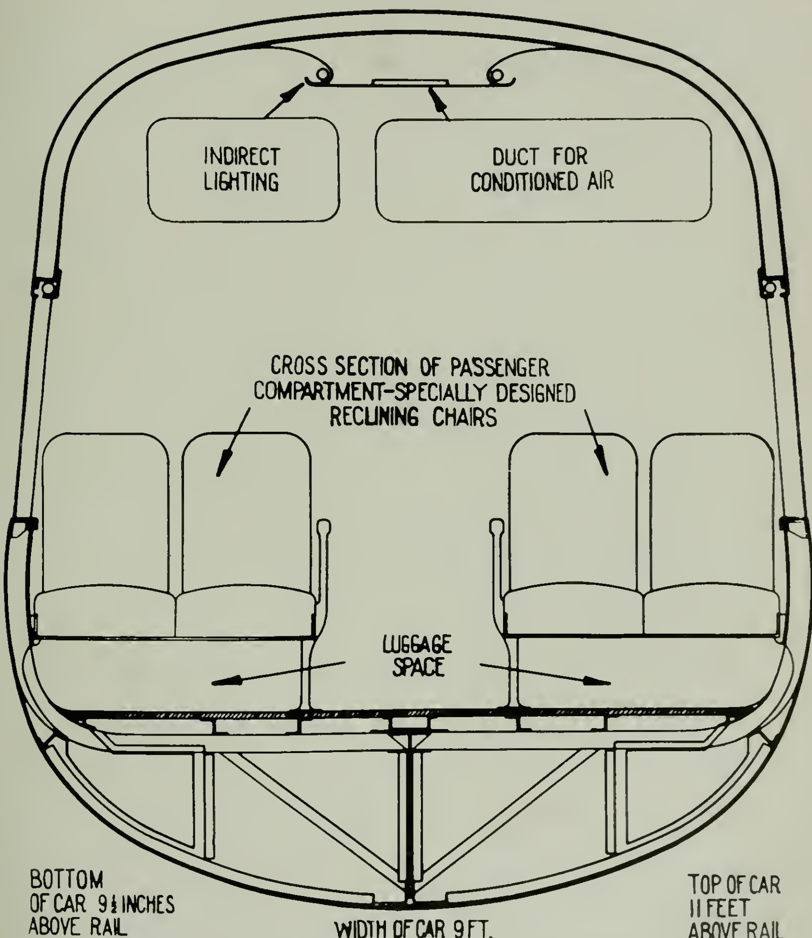
The method of framing the car bodies is illustrated in full size cross section by the exhibit which has been placed at our disposal by the Aluminum Company of America; also by samples of extruded sections, and will be further illustrated by lantern slides. The side entrance doors, when closed, are flush with the exterior, and are in combination with steps that fold up or down as needed. Baggage and mail doors are of the flush sliding type. Electric signals afford communication between train crew and motorman. A powerful headlight is streamlined into the cab roof and includes the use of a vertical light beam in addition to the horizontal beam, for added safety. Marker lights and tail lights are flush with the body and every effort has been made to avoid projection that would cause wind resistance.

The interior of coaches is lighted by a three stage, indirect system, employing 200 10-watt lamps in each coach. The interior decorative treatment is along simple modernistic lines. The seats are of the reclining type and are provided with aluminum trays for buffet meal service. The buffet in the rear end of the rear car is provided with an oil fired range, electric refrigerator and other convenient accessories.

The choice of materials of construction consistent with securing light weight and necessary strength narrowed down to the aluminum alloys or the high-tensile chrome nickel steels. The decision was to use the aluminum alloys for the entire car structure excepting the bolsters and articulation end castings, which are of nickel alloy cast steel. There was a ten-year background for this decision, including several million pounds of aluminum in actual passenger car construction.

The fabrication of aluminum as represented by its alloys has been the field for some very progressive development and rather novel methods of car construction. The most advanced of these methods is the use of extruded metal shapes which take the place of the usual rolled shapes and pressings. Extruded shapes are produced by squeezing the ingot metal through a steel die forming one end of the cylinder of a powerful hydraulic press. Under a temperature of approximately 900 degrees F. the ingot metal will flow through the die under a fluid pressure in the ingot ranging from 45,000 to 60,000 pounds per square inch. It is extruded in lengths up to 90 feet, and may be heat treated as extruded.

The producers of aluminum, co-operating with the car builders, have been able to produce all the desired shapes outlined by the car designer with a relatively small outlay for dies, as compared with rolls, and such shapes are being made with tolerances varying but one to four thousandths of an inch from exact dimensions. This permits the designer to interlock various extruded sections of such contours as to produce a car structure of minimum weight, maximum strength, also a minimum of deflection, inasmuch as a large moment of inertia can be secured with a relatively small area of metal, and a small amount of



Cross Section of the Passenger Compartment.

riveting. Aluminum plates are readily cold formed to the curved surfaces necessary for ideal streamlining.

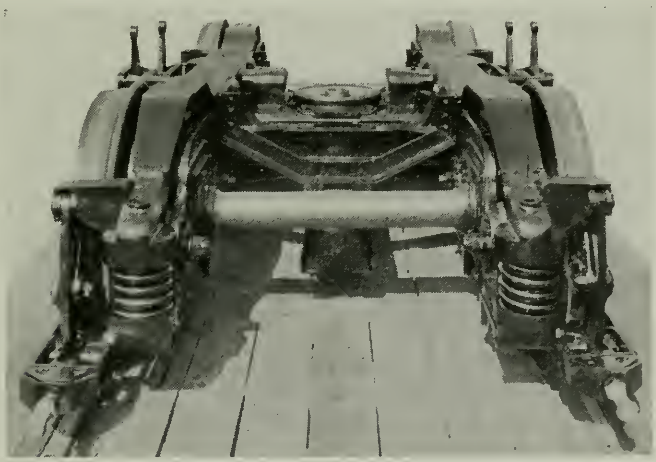
There is much new research and development taking place in the high alloy steel field as well as in the field of aluminum alloys, and we may expect to see improved materials of construction for use in further reductions of dead weight in car construction. This refers as well to freight as to passenger carrying cars, as evidenced by several recent examples.

Articulation

Articulation between unit cars is almost a fundamental necessity in connection with light weight, streamlining, and minimum resistances. It also avoids the use of couplers and draft gears and complicated vestibule arrangement. It prevents slack between cars as the center plates are practically the couplers. It does not, however, allow the usual flexibility of switching, which on long, fast schedules is rather in its favor. Articulation reduces the required number of trucks and hence the cost of construction, maintenance, and inspection. There are several forms of articulation worked out for railway cars. However, it has been our experience that the form used has a direct bearing on riding qualities, and our preference is for that type having independent bearing of each adjoining car center plate on the bottom or truck center plate, and for flat instead of spherical bearing surfaces. To secure proper closure between cars a vertical drum about 3 ft. diameter and 8 ft. high is fitted between cars and is pierced by door openings front and rear. Flush flexible closures also extend around sides and roof between adjoining cars to prevent eddy currents. A maximum curvature of 20 degrees is provided for.

Trucks

Of the various elements that are combined to make a light weight high speed train, none is of more fundamental importance than the trucks. They carry the rolling load along the rails at great speeds, under which they are subject to high impacts and the fluctuation of terrific dynamic shock. Contrary to popular belief, the chief function of a high speed truck is, by its construction, to translate the inevitable sharp vibratory action of wheels and axles into a quiet regular rectilinear motion free from vibrations, at the center plate, and hence easy riding of the coaches. That becomes more difficult as loads decrease and speeds increase. There is not only the problem of vertical motion, but as the wheel flanges are restrained between the rails, irregular horizontal forces are set up that may become the major problem. While articulation has nearly all the advantages, including saving in weight and cost, as well as track and air resistance, it has one inherent disadvantage that the trucks cannot be located approximately near the center of percussion of the body mass, as in regular practice with two trucks under each car. Therefore, at the outset, the truck problem was subject to greatest consideration. It was decided that for the power trucks, where the weights were as high as needed, the conventional 4-wheel equalized swing bolster truck was suitable. Each power axle carries a 300 H.P. motor of the suspended type, roller bearing, with armature geared to axle at a one to two ratio. For all other trucks where smooth riding is of paramount importance, the so-called modified Hirshfeld type truck was used. The main principle of this type truck is to confine the unsprung weight to the wheels, axles and bearings, and to drastically insulate both shock and noise at this point by the liberal use of rubber acting in shear only. The principle is analogous to rub-



One of the Welded Four Wheel Type Light Weight Trailer Trucks.

ber engine mounting employed in automotive practice. Four huge "rubber doughnuts" are used at each wheel, or 16 per truck. The static load is carried largely but not entirely by coil springs, permitting the rubber to handle the dynamic shocks. As the journal boxes have ample clearance in the pedestals, the rubber insulation of the wheels and axles is practically complete. These trucks are also provided with a transverse floating bolster, suspended on four slightly inclined swing hangers, to neutralize side sway. Hydraulic shock absorbers are interposed between the truck frame and floating bolster to damp out horizontal forces. While the power trucks have 36″ wheels and outside roller bearings as a matter of necessity for traction motor clearance, all other trucks are provided with 33″ wheels with roller bearings inside the wheels. The purpose is to save weight and reduce air drag at high speeds. While alloy cast steel was used largely for the trucks of the first train, the trucks for the 6-car train were fabricated of welded Cor-ten steel plates with some improvement in weight and strength. All truck bearings on the first and second trains are of the roller type, furnished by S.K.F., and are liberally oversize for the loads carried. Wind tunnel experiments on models indicated that shrouding the trucks would be beneficial. Experiments made afterward on the first train indicated that the shrouds would permit of a slightly higher maximum speed—about 3 M.P.H.

Streamlining

Streamlining the exterior of fast moving vehicles to reduce power consumption due to air drag is not entirely a recent idea, though much of the art and results are rather recent. Thirty years ago your speaker assisted in designing the first McKeen rail motor car. The body of this car was streamlined to a marked extent even at that period, as may be seen by reference to the diagram, and all subsequent McKeen cars were streamlined. The coming of the wind tunnel and the aerodynamic laboratory has resulted in a vast amount of practical knowledge in the art of streamlining of aircraft, much of which is applicable to our problem. However, there are certain fundamental differences in streamlining a plane, or dirigible in free flight, and a rail vehicle subject at all times to the effect of ground air drag. Streamlining the exterior of fast moving vehicles has recently been receiving serious attention in the automotive field, as well as by railroads. There are a number of recent examples of streamlined unit cars and trains, both here and abroad, and wherever it has been scientifically applied it has resulted in satisfactory power reduction at high speeds or has permitted higher speeds with equal power. The application of streamlining is of primary importance when applied to cases where the power supply must be limited, as in oil-electric practice. Reduction of air drag, through careful attention to streamlining, was given extended research in connection with designing the exterior shapes of the Union Pacific high speed trains. They were, in a sense, born in the wind tunnel. Preliminary scale models of the first train were tested in the University of Michigan, Ann Arbor, wind tunnel under a competent staff. Much of the work was done at 80 or 90 mile air speed in order to secure data corresponding to running speeds. As the tests progressed it was found necessary to reject some preliminary work as assumptions that applied to testing aircraft models were found to need revision where ratio of length to cross section, the element of ground drag and other elements relative to the train model, were somewhat different from aeronautical work. The work consisted of a series of approximations and occupied several months of intensive research. After all suggested practical refinements in the model had been made, final measurement of the drag in the wind tunnel, and applied to the proposed train, indicated that the train, traveling at 90 M.P.H., would have a total wind drag of approximately 970 lbs., therefore requiring 233 rail H.P. or 290 brake H.P. to take care of the wind factor alone. All mechanical resistances, due to journals, flange, rolling, etc., were estimated by the best available formulae, at approximately 900 lbs. at 90 M.P.H. The total calculated resistance was, therefore, approximately 1870 lbs. at 90 M.P.H., which calls for 450 rail H.P. or 560 B.H.P. These figures have since been closely verified in a series of road tests where electrical output readings were recorded in various runs for several days, while air brake stopping tests were also being recorded. As the maximum engine output is 660 B.H.P., of which approximately 600 H.P. is available at the generator, the balancing speed is approximately 91 M.P.H. The specification called for a balancing speed of 90 M.P.H.

Power Plants

The original development of the Diesel engine is an interesting story in itself. In southern Germany stands the ancient city of Augsburg, founded 50 years B.C. by Augustus Caesar, and in medieval times the cross roads of commerce in Europe. Some 40 years ago a German scientist, named Diesel, conceived of the idea of an internal combustion engine working at very high compression so that air compressed to a high pressure, about 500 lbs. per sq. in., and consequent high temperature, about 1100 degrees F., would be ready to receive and ignite an injected charge of fuel. Working with Dr. Diesel was his colleague, Dr. Lauster, who told the writer this story. Dr. Diesel's original conception was to inject powdered coal into this new engine as fuel in order that coal might be used with much higher heat efficiency. His experiments with powdered coal were unsuccessful and he abandoned the project. Finally, under Dr. Lauster's persuasion, he again took up the project using liquid fuel and this simplified the problem of injection, and in 1897 the first successful Diesel engine was built and operated at Augsburg.

After the war Dr. Diesel attended a conference in England and on his return to Germany disappeared from a Channel steamer and thus was unable to live to see the marvelous development of his invention.

The power plant for the first, or 3-car train, consists of a distillate burning engine of the carburetor type developed by the Winton Engine Company. It is a 12 cylinder V type with cylinder 7½″ diameter by 8½″ stroke, rated at 600 H.P. at 1200 R.P.M., weighing 16 lbs. per B.H.P. The entire engine frame, including crankcase and water jacket is of welded wrought steel construction, furnished by Lukens Steel Company. The crankshaft, which is dynamically and statically balanced, is of chrome nickel molybdenum steel with elastic limit of 130,000 lbs. per square inch and 300 Brinell. The distillate fuel of 36 gravity is handled by special type carburetors, of the multiple jet fixed air ratio type, one to each cylinder, attached directly to the cylinder head, no manifolds. Atomization of the fuel is accomplished without application of heat. The fuel is supplied to the carburetors by electric driven turbine pumps with gravity return to fuel tank, and as floats and needle valves are not used there is no surplus fuel carried in the engine room. Fuel is carried for a 1,200 mile run.

The power plant for the second, or 6-car train, consists of the Winton 2-cycle, 12 cylinder, V type, Diesel engine, rated at 900 H.P. at 750 R.P.M. and is 20 ft. in length. The cylinders are 8″ diameter by 10″ stroke. This engine is constructed on the Uniflow principle, having four exhaust valves in each head, which permits a rapid discharge of residual pressure and allows a very complete scavenging. Cylinders are ported at bottom of stroke for the intake of air for scavenging and loading for the compression stroke. This air is supplied at about four pounds pressure by a gear driven Root type blower with spiral vanes. By this design of engine each part of cylinder is kept at practically uniform temperature, and so-called thermal eccentricity, with its attendant heat stresses, is largely avoided. The engine, on the test block, has shown a fuel rate of .38 lbs. of fuel per B.H.P.H. in contrast with .72 lbs. for the 600 H.P. gasoline type engine on the first train. In each case the fuel was the same, namely Parco Distillate.

Solid fuel injection is by means of a highly developed fuel injector on each cylinder, of extreme metering, timing and throttling precision, allowing a wide speed-load range with smokeless exhaust. This allows the train speed to be regulated by the throttle. The engine is further regulated by means of a Woodard type governor which embraces two features: First, an over-speed feature which governs the maximum speed of the engine; and second, an intermediate speed regulating feature by means of which, when the throttle is set at any intermediate speed, a constant speed of the engine is obtained under all fluctuations of load.

The electric transmission is similar to that on the first train except that the entire front car is devoted to power and auxiliaries, and there are four traction motors mounted on the first and second trucks.

Engine Cooling System

The engine cooling system used on these trains is a decided improvement over the usual practice. The radiators are suspended under the roof inside the car. Two power fans of approximately 30,000 cubic feet per minute capacity take their air supply through the grilled openings in the front end, dump the air into the air tight engine room which is thus under pressure. This air escapes through the radiators into a slot in the roof, surrounding the exhaust pipes and muffler. This inside cooling system was necessary to meet the high speed requirements with minimum resistance, and has proven satisfactory. It also results in a slight supercharging effect on the engines.

Cab Equipment

The motorman is located in an elevated cab convenient to instrument panels and controls. He has a wide range of vision and the cab is insulated from power plant noise. On the panel board he can check engine speed and temperature, oil pressure and viscosity, and electrical output. Throttle, controller, brake valve, sander, and other operating controls are conveniently located. The brake valve includes a dead man's control, although a second man is carried in the cab.

Generator

Electrical equipment, consisting of generator, traction motors and control, were designed for these particular power plants. The generator, which is directly connected to the engine, carries a built-in exciter so designed that the current demand of the traction motors regulates the amount of generator voltage in such a manner that the load on the engine is constant at any car speed and solely under the control of the engine throttle.

The traction motors are rated at 300 H.P. each, are mounted two on each truck of the power car, and are geared to the wheels at a one to two ratio. The motor armatures are carried on roller bearings. The auxiliary power plant on the first train consists of a 25 K.W. auxiliary generator at 76 volts, which is belt driven from the main engine. The second train has an auxiliary generator unit consisting of a four cylinder 5″ x 7″ two cycle Diesel engine directly connected to a 220 volt A.C. generator which furnishes power for the auxiliaries, control, lights, air conditioning equipment, heaters, pumps, etc. The auxiliary engine is of the same general construction as the main engine. The electric system throughout the second train uses 220 volt three phase current for all motors above one-quarter h.p. and 32 volt for small motors and lights.

Air Brake

The problem of arresting 54,000,000 foot pounds of energy on the 3-car train or 120,000,000 foot pounds of energy on the 6-car train at 90 M.P.H. in the space of 40 seconds, or about half a mile, brings us to the braking requirements of these high speed trains. To meet the requirements of making stops from speeds of 90 and even 100 M.P.H. within standard distances, it was necessary to develop an entirely new braking system, which has been successfully accomplished by the N. Y. Air Brake Company. The action of the air brake at these higher speeds had not been explored and was largely a matter of conjecture. Heretofore, uniform brake retardation was not possible due to the fact that the coefficient of friction between brake shoe and wheel varies widely with speed and unit pressure, decreasing rapidly at the higher speeds where it is most needed. While this coefficient may be as high as 25% at very low speeds, it fades out to probably 5% or 6% at 100 M.P.H. While very high percentages of braking power are safe at the higher speeds, they would become dangerous as speed decreased and the coefficient of friction between shoe and wheel gradually increased. A point would be reached where the wheels would lock. It would not be safe to trust the judgment of the enginemen to graduate the cylinder pressure down as speed fell off. In this new brake, in either service or emergency, a very high initial braking percentage is used. The brake cylinder pressure is then automatically controlled, in proportion to speed, by means of a very simple retardation control principle, incorporated in an instrument called a decelekron. This instrument consists essentially of a sliding weight of about 100 lbs., sensitively mounted on ball bearing rollers, and arranged to move in the line of motion of the train. It is suitably restrained from initial motion by a calibrated spring and air piston. This weight, acting through suitable leverage to a pneumatic valve, controls the brake cylinder pressure accurately in proportion to the retarding effect. If retardation exceeds the safe degree, the sliding weight automatically reduces the braking effect. This reduction continues until, just before rest, there is just enough air in brake cylinders to stop the train without lurch or jar. In recent road tests with the first train this brake made service stops from 90 M.P.H. in 2745 feet. This compares with a service stop of 2500 to 3000 feet with the usual steam train brake from 60 M.P.H. If we square these speeds for the energy effect, the effctiveness of the new brake can be appreciated.

The air brake described is a complete departure from conventional practice, both in its air circuit, and in the design of the valves and parts. The pneumatic feature is based on a two-pipe circuit, consisting of a supervisory line and a control line. The supervisory line distributes air to the reservoir under each car and charges to maximum pressure at all times. In conventional brakes the reservoirs cannot be charged during brake application. The purpose of the control line is to apply or release brakes by admitting air to the pneumatic relay valve under each car, this valve controlling communication between each brake cylinder and its adjacent reservoir, or, from the cylinder to the atmosphere. This control line passes from the engineer's brake valve through the decelekron valve, to each relay valve. This briefly describes the pneumatic action. Parallel to this pneumatic circuit lies an electrical circuit which operates a magnetic control feature in each pneumatic relay valve. This not only synchronizes but accelerates all brake applications and releases. The result is a brake of exceptionally quick and sensitive reponse, and a retardation rate of 3 to 3½ M.P.H. per second is possible.

Air Conditioning and Insulation

Air conditioning is effected, both heating and cooling, by means of three air ducts, one extending along center of ceiling, one on each side at floor line. In the 3-car train these ducts extend full length of both coaches and lead to the air conditioning plant in the baggage compartment. They are provided with insulated flexible connections between cars. In summer, the cooled air is distributed through the ceiling duct, while the floor ducts are used as an exhaust. In winter, the heated air, after passing through the automatic oil fired heaters, is distributed through the floor ducts, while the ceiling duct is used to take out the vitiated air. All ducts are handled by power fans, making circulation positive and complete. Temperatures are automatically controlled by thermostats located in coaches. The amount of fresh air is manually controlled. Freon is used as the refrigerant. The car bodies are insulated throughout with two inches of Rock-floss, a fireproof material of high insulative and sound deadening properties.

Conclusions

Earlier reference was made to the future developments of the Diesel engine in rail transportation. In concluding this paper attention is directed to one factor now existing that will retard more rapid progress, viz. that in order to cross the continent, as illustrated, with only $70.00 worth of fuel it was necessary to make a large investment in the total power plant, consisting of the Diesel engine and the electrical transmission system. The electric transmission is only 80% efficient at the best power output and the losses may run up to 40% or 50% at times. While the manufacturers have supplied a substantial Diesel engine weighing 20 lbs. per B.H.P., it is necessary to add 42 lbs. per B.H.P. for electrical equipment to transmit the engine power to the wheels. Until the manufacturers of electrical equipment can improve power efficiencies and decrease the weight of electrical equipment the Diesel engine will remain under a handicap to which it is not entitled. While the possibilities are remote at this time, some substitute for the electric drive may be ultimately devised: That is a problem that should be receiving the consideration of those principally involved.

NOTE: A large number of Steroptican pictures were shown illustrating principal features of these trains, a few only of which are shown in the paper.

PRESIDENT: Gentlemen, I know the hour is getting late and we are going to be ready to serve the collation in a few moments, but I know there are some who will desire to say something on this very interesting subject on which Mr. Fetters is so well posted, and there may be a question or two that some of you may desire to ask. It is understood that we do not want to go into any controversial discussion of the subject at this late hour.

There was a very vicious attack (!) made on one of our members by the speaker during the presentation of his paper, and it is only fair to give him an opportunity to defend himself, Professor Endsley.

(The President referred to a side remark of the speaker, in referring to a certain comparison of Diesel and steam locomotive performance. "I see Professor Endsley sitting in front of me. He probably will criticize this.")

PROF. LOUIS E. ENDSLEY: I am not going to question his statement that this train made a speed record. I know the speaker. He is not only a railroader but I know that after he was fifty years old he built his own airplane and flew it himself.

I was very much interested in this paper. Gentlemen, the Diesel engine is coming. The time and the application depends on some developments that no doubt will come. The steam locomotive has done its work well and it will still do more work for many years. But the ultimate test will be, what form of power will haul the train with the least amount of money.

Mr. Fetters has explained this new train very well. This stream-lining is an improvement. But there is one question I would like to ask the speaker. Some work was done at the University on some models that showed that at an angle of 30° to the wind the train required more horse power. It that the fact?

MR. FETTERS: I can answer that question. When the model was angled off at 20° to the wind with no increase in the air velocity of 90 miles an hour the increase in horse power between head on and 20° amounted to 24 additional horse power, plus 3 or 4 H.P. on top of that for increased flange resistance—about 28 total added horse power. This is due to the fact that we expose a thousand "paddles" on the side of a conventional train to catch the wind, hence the stream-lined train gives a very much better performance in angling to the wind than the ordinary train.

PROFESSOR ENDSLEY: That answers my question and I have enjoyed it very much.

PRESIDENT: Does any one else care to offer any discussion or ask any question? I think we have in the room a gentleman who knows something about this subject, Mr. J. P. King, Mechanical Engineer, Gulf Mobile and Northern Railroad. They are one of the latest additions to the stream-line family.

MR. J. P. KING, Gulf, Mobile & Northern Railroad, Mobile, Ala:

The demand in our territory is for medium speed, comfortable passenger service. Therefore, we endeavored in designing our two trains to supply a train to meet these requirements. We feel that the four-car train will have ample speed to maintain schedule of forty miles per hour with stops spaced at about ten miles and not exceeding seventy-five miles per hour top speed.

Reliability and sturdiness is the prevailing factor in the design, hence, the choice of a power plant and electrical transmission, with experience and background. Air conditioning and other minor features will supply comfortable travel we believe.

PRESIDENT: Thank you, Mr. King. Does anybody else want to say anything? I see the boys have the tables ready for your attention and unless there is something further I will ask Mr. Lanahan to close the discussion.

MR. FRANK J. LANAHAN: You ask some discussion from me? You must remember that I am in the malleable iron business and it would be akin to participating in my own funeral to actively take part in Mr. Fetters' subject. My position tonight is similar to the story I told the Club some years ago of the two sparrows sitting in a tree as they saw for the first time, an automobile. With apprehension, Papa Sparrow took in the situation and with tears in his eyes, disconsolately laid his head over on Mama Sparrow's breast, who sympathetically inquired the trouble. Pointing his wing to the exhaust of the automobile, he replied, "My dear, there goes our meal ticket." We can all remember the commotion raised a decade ago when on the main arteries of traffic we saw signs reading, "No horses allowed," now we realize it was but a forerunner of many other changes. In the light of these developments, we can admire these cars, even if they are not protected with malleable iron. We must not lose sight of the lesson in the old couplet:

"Here lies the body of John J,
  Who died defending his right of way.
He was right, dead right, as he sped along,
  But he's just as dead as if he were dead wrong."

It must be recognized that the course of progress cannot be stayed. Think of the remarkable things that have transpired in our own lifetime. Some of which are so recent that they occasion vivid recollections. The introduction of the telephone, Marconi's miracles with wireless, and it seems but yesterday that the automobile made its appearance. Then the astonishing feats of the aeroplane, and the marvels of the deep submarine. Really, transportation is now having another inning, but Time waits for no man, and no one thing monopolizes for long the front page of the daily papers. The accomplishments of the "Zephyr" were not yet an echo when we read of a chap named Doolittle going from Coast to Coast in less than ten hours, and then to substantiate that this was not spectacular, a schedule of regular transportation from New York at 5:30 in the evening and landing in San Francisco the next morning at 9:30 was made a daily routine. It is all nigh near unbelievable. With television on its way to perfection, astronomy penetrating millions of miles into space, Einstein wrestling with relativity and scientists analyzing the atom, we will be so far advanced there won't be much more left to acquire.

When all this transpires, malleable iron may have companions on the by-way, and as "misery loves company" we will join in the tears of our new associates who have been shunted from the main commercial highways in the conflicts with progress, and should the whirligigs of time enmesh Mr. Fetters, and it be his fate to be out-moded, those who have preceded him, like malleable iron, will remember the enconiums with which he was lauded, and act as host for the newcomer.

Joking aside, this paper is a revelation. It is a story of accomplishment broaching the miraculous. It has been masterly handled by the speaker who is exceptionally well versed in his subject. While technical, at the same time it has been easily comprehensible to the non-technical hearers. To Mr. Fetters we are indebted very deeply and he vied with our President tonight for honors. Rather the two made an unusually harmonious duet. Mr. Flinn has sort of revolutionized our organization. As I mentioned once before, he has taken the "Old Lady" for a joy ride and they are going places fast. Our progress is noteable; the increase in membership continues and each succeeding night the attendance is more numerous. Mr. Porter has added wonderfully to the attraction of our gathering with his musical entertainment. An especial treat have we had tonight, and we are truly indebted to Mr. Fetters for giving us an interesting, enjoyable and instructive "Mental Ride" on his novel streamline train. He was the combined engineer, conductor and superintendent, and brought us safely to the end of our journey, therefore, we would move, Mr. President, that in token of our great appreciation of our trip, that we extend to the gentleman a standing vote of thanks for his courtesies to us.

The motion was duly seconded and prevailed by unanimous standing vote.

PRESIDENT: Before ringing down the curtain, do not forget the lunch. The Secretary asks that you leave the song sheets in the chairs so they may be gathered up for use at the next meeting. And the boys will have a little informal singing around the piano for those who care to join in.

If there is no further business, we now stand adjourned.

J. D. CONWAY, Secretary.

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By J. C. SHINGLEDECKER,
Supervisor of Service Station, The Pennzoil Company

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OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV No. 4 — Pittsburgh, Pa., Feb. 28, 1935 — $1.00 Per Year 25c Per Copy

INDEX—ADVERTISERS.

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PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING FEBRUARY 28, 1935

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock P. M. with President R. H. Flinn in the chair.

Registered attendance, 412, as follows:

MEMBERS

Adams, F. W.
Allen, Harvey
Ambrose, W. F.
Ament, F. C.
Arnold, J. J.
Baker, J. B.
Balzer, C. E.
Barr, H. C.
Batson, J. F.
Baughman, G. W.
Beam, E. J.
Bell, Dan H.
Beltz, J. D.
Beswick, R. M.
Bonhoff, E. L.
Britt, T. E.
Buchanan, C. C.
Buck, E. R.
Buffington, W. P.
Burgham, M. L.
Buzzard, J. P.
Callahan, D. E.
Cannon, T. E.
Carlson, H. E.
Carmody, J. J.
Carr, T. W.
Carroll, D. C.
Carter, S. T.
Case, H. D.
Chaffin, H. B.
Chalker, A. R.
Chesley, J. O.
Chilcoat, H. E.
Chipley, G. R.
Christy, F. X.
Christy, G. J.
Clark, C. C.
Clark, H. C.
Clements, F. C.
Conway, J. D.
Coombe, A. B.
Courtney, Harry
Crawford, A. B.
Crenner, J. A.
Cunningham, W. P.
Dalzell, W. E.
Davis, Charles S.
Dean, E. E.
Dean, W. H.
Dehne, G. C.
Dempsey, A.
Diepeveen, C.
Dierker, R. H.
Diven, J. B.
Downing, J. A.
Durell, W. A.
Edwards, C. H.
Egbert, J. A.
Egly, M. J.
Endsley, Prof. Louis E.
Emery, E.
Emsheimer, Louis
Escott, Charles M.
Evans, Charles S.
Evans, R. E.
Fair, J. M.
Fenton, H. H.
Ferguson, George
Ferguson, R. G.
Fike, J. W.
Flinn, R. H.
Folan, J. V.
Forsberg, R. P.
Fralic, C. F.
Frauenheim, A. M.
Freshwater, F. H.
Furch, G. J.
Gandy, Ralph H.
Gardner, George R.
Gellatly, W. R.
Gemmell, R. W.
Gilbert, William J.

Gilg, Henry F.
Glaser, J. P.
Goble, A. S.
Goda, P. H.
Goldstrom, Gustav E.
Goodman, O. F.
Gottschalk, Clem W.
Graham, H. E.
Gray, T. H.
Gray, M. L.
Grieve, Robert E.
Gross, John
Groves, Walter C.
Haggerty, J. F.
Haller, Nelson M.
Hamilton, William H.
Handloser, B. F.
Hancock, Milton R.
Hansen, William C.
Hawkes, T. L.
Hayward, Carlton
Helfrich, F. A.
Hemma, Charles H.
Herrold, A. E.
Hervey, R. S.
Higgins, George A.
Hilstrom, A. V.
Hofmann, E. L.
Holland, S. E.
Holmes, E. H.
Hoover, J. W.
Hopper, George
Hornefius, S. R.
Huber, H. G.
Huff, A. B.
Hunt, Lawrence
Irwin, R. D.
James, J. H.
Johnson, Ira S.
Johnson, J. W.
Jones, L. E.
Kane, H. S.
Kaup, H. E.
Keck, L. M.
Kenney, A. R.
Kellenberger, K. E.
Keller, R. E.
Kentlein, John
Kerr, Charles, Jr.
Kessler, A. L.
Kirk, W. B.
Klassen, F. G.
Knable, G. Elkins
Knoff, R. A.
Kruse, J. F. W.
Kusick, Henry F.
Knoke, H. C.
Koch, C. W.
Krahmer, E. F.
Kramer, W. E.
Kraus, Raymond E.
Krause, H. A.
Lackner, R. A.
Lanahan, Frank J.
Lanahan, J. S.
Larson, W. E.
Lawler, Joseph A.
Leban, J. L.
Lee, L. A.
Loeffler, George O.
Logan, J. W., Jr.
Longdon, Clyde V.
Lundeen, Carl J.
Lynn, Samuel
Maliphant, C. W.
Marsh, Ernest A.
Masterman, T. W.
Mayer, L. I.
Megee, C. R.
Meinert, Henry J.
Meredith, A. R.
Metzgar, H. T.
Millar, C. W.
Miller, J.
Mills, C. C.
Mills, O. B.
Misklow, C. J.
Misner, George W.
Mitchell, J. G.
Mitchell, W. S.
Moir, W. B.
Molyneaux, Dawes S.
Morgan, A. L.
Morgan, Homer C.
Mowry, John W.
Mulvey, J. I.
Murray, C. C.
Murray, Stewart
Musgrove, W. W.
Mussey, D. S.
McCrossin, C. D.
McHail, J. L.

McIntyre, R. C.
McKay, N. H.
McKenzie, Edward F.
McKinley, A. J.
McKinley, J. T.
McKinstry, C. H.
McKinzie, E.
McLaughlin, H. B.
McNamee, William
McTighe, B. J.
Nash, R. L.
Nicklaus, C. G.
Noble, Jesse A.
Oehlschlager, W. A.
O'Leary, J. J.
Orchard, Charles
O'Sullivan, J. J.
Overholt, B. C.
Paisley, F. R.
Palmer, E. A.
Park, C. L.
Porter, H. N.
Pringle, H. C.
Pringle, Paul V.
Posteraro, S. F.
Purchard, Paul
Ralston, J. A.
Rankin, B. B.
Rauschart, E. A.
Read, A. A.
Redding, P. E.
Reeve, George
Renshaw, W. B.
Richardson, Fred
Richardson, H. R.
Riley, O. W.
Roberts, E. L.
Robertson, A. S.
Robinson, L. O.
Rodeniser, B. H.
Rodkey, C. C.
Rushneck, G. L.
Rutter, H. E.
Ryan, D. W.
Ryan, J. M.
Schaffer, George F.
Schauers, R. W.
Scheline, William A.
Schmitt, Andrew
Schrecongost, C. P.
Schultz, D. C.
Searles, E. J.
Seiss, W. C.
Sekera, C. J.
Servais, Francis W.
Severn, A. B.
Shackelford, L. P.
Shellenbarger, H. M.
Shingledecker, J. C.
Sheridan, T. F.
Shultz, L. W.
Simons, Philip
Simpkins, Fred E.
Sipe, D. A.
Sixsmith, G. M.
Slagle, Charles E.
Smith, Gilbert M.
Smith, T. R.
Snyder, J. J.
Stevens, R. R.
Stewart, C. D.
Stewart, J. D.
Stoffregen, Louis E.
Stratford, C. T.
Suffern, R. J.
Sullivan, P. W.
Sutherland, Lloyd
Swope, B. M.
Sykes, A. H.
Taylor, H. D.
Taylor, J. M.
Ternent, H. J.
Thomas, Theodore
Tipton, G. M.
Tomasic, N. M., Jr.
Toussaint, R.
Trautman, H. J.
Trax, L. R.
Triem, W. R.
Troxell, H. K.
Tucker, John L.
Van Blarcom, W. C.
Van Vranken, S. E.
Van Woert, F. E.
Vollmer, Karl L.
Vowinkel, Fred
Weaver, W. Frank
Webb, W. W.
Weis, Frank E.
Wikander, O. R.
Wilson, W. S.
Wilt, Howard H.

Woods, G. M.
Woodward, R.
Woollen, A. H.
Wright, Edward W.
Wright, John B.
Wurts, T. C.
Wynne, F. E.
Yeardley, Harry
Zearley, J. P.

VISITORS

Arnold, J. G.
Atkins, T. E.
Baker, W. E.
Balquist, N. F.
Balzer, C. E., Jr.
Bercher, H. J.
Boland, Thomas
Brown, Homer
Burke, J. V.
Butler, Arthur
Byerly, George J.
Byham, D. E.
Campbell, F. D.
Carlson, L. E.
Carver, A. B.
Chalker, H. S.
Chrystal, W. A.
Corbett, Joseph L.
Courtney, Harry, Jr.
Crittenden, P. L.
Cronk, C. D.
Cunningham, H. L.
Deeds, J. R.
DeVenzio, V. F.
Devlin, James
Dunham, C. W.
Dunham, Paul W.
Dunn, J. H.
Edwards, Walter
Elliott, C. A.
Evans, T. E.
Felter, F.
Ferguson, J. E.
Finell, Robert H.
Flowers, H. Fort
Follett, W. F.
Fowler, Herman W.
Fowler, W. E., Jr.
Fusek, M.
Gamble, H. J., Jr.
Gardner, K. C.
Goodman, John
Goodwin, A. E.
Graham, J. H.
Gray, George R.
Groffins, Paul B.
Guard, W. M.
Holleran, T. J.
Hoover, Jack
Hoover, William
Hyett, R. A.
Hysong, John D.
Ibana, A.
Irvine, E. T.
Jados, W. I.
Jeanis, C. B.
Johnston, Richard M.
Keene, J. C.
Knight, Fred
Krapp, A. L.
Kulp, W. A.
Lackner, Robert F.
Larkin, Jack
Leaf, C. S.
Lewis, N. F.
Lewis, S. B.
Logan, W. J.
Lumpp, R. J.
Malencock, Van M.
Maloney, James P.
Meinert, Richard H.
Miller, Bernard B.
Miller, Paul J.
Mills, Prentice
Mitchell, Paul S.
Molyneaux, Stewart
Moore, M. K.
Murray, T. H.
McCann, Daniel J.
McCarthy, F. C.
McCormick, Arthur W.
McCrackin, David
McCuen, Wallace C.
McKean, W. N.
McNamara, F.
McWilliams, J. B.
Nichols, S. A.
Ostran, H. U.

Pitts, Linus
Quinn, John J.
Quinn, W.
Reeve, George G.
Regath, George
Reynolds, D. E.
Roberts, J. B.
Robinson, H. J.
Robitzek, A. R.
Russell, H. S.
Schmerber, L. B.
Schott, F. J.
Smith, R. B.
Smith, Sion B.
Snead, J. R.
Stacy, Rev. R. G.
Tomlinson, C. E.
Vandivort, R. E.
Van Vlack, Walter
Voelker, S.
Vogelsang, Hans
Vollmer, Paul F.
Waxler, Brice
Weis, Mrs. Frank
Yohe, J. K., Jr.
Young, C. R.
Young, J. H.
Zanger, J. A.
Ziggon, L. A.

PRESIDENT: We will start in with the business part of the meeting and get it over with as promptly as possible, because we have a rather elaborate program of entertainment for tonight.

We will dispense with the roll call, as the registration cards provide that record, and I hope you have all signed these cards.

Also we will dispense with the reading of the minutes of the last meeting because I am happy to announce that our efficient Secretary had the printed Proceedings in the mail about a week ago and all the members should have had them before this time.

We will proceed at once to the announcement of the new members. As has been customary I will ask the new members to stand as I read the names that you may know them. Since our last meeting the following named gentlemen have been added to our membership roll:

Beswick, Richard M., Tester, Westinghouse Air Brake Company, 514 Chicora Street, East McKeesport, Pa. Recommended by L. E. Carlson.

Buchanan, Charles C., Engineer, Union Switch & Signal Company, 1444 Marlboro Avenue, Wilkinsburg, Pa. Recommended by C. M. Wheeler.

Buck, L. L., Engineer, Union Switch & Signal Company, 4716 Ellsworth Avenue, Pittsburgh, Pa. Recommended by C. M. Wheeler.

Burriss, W. C., Inspector, Westinghouse Air Brake Company, Wilmerding, Pa. Recommended by John B. Wright.

Cadwallader, W. H., Vice-President, Union Switch & Signal Company, Swissvale, Pa. Recommended by C. M. Wheeler.

Cage, Charles A., General Foreman, Mechanical Department, B. & O. R. R. Co., 213 Kimberly Avenue, Somerset, Pa. Recommended by T. E. Britt.

Carothers, J. A., Treasurer, Pittsburgh Tool-Knife & Manufacturing Company, 7501 Thomas Boulevard, Pittsburgh, Pa. Recommended by William R. Gellatly.

Carter, John D., General Agent, Union Pacific System, Oliver Building, Pittsburgh, Pa. Recommended by J. D. Conway.

Carter, S. T., Engineer, Superior Railway Products Corporation, 7501 Thomas Boulevard, Pittsburgh, Pa. Recommended by William R. Gellatly.

Christy, P. J., Assistant District Manager, Chicago Pneumatic Tool Company, 237 North 12th Street, Philadelphia, Pa. Recommended by W. B. Moir.

Crowell, F. C., Foreman, Car Department, Pennsylvania Railroad, 1120 Piedmont Avenue, Canton, Ohio. Recommended by W. B. Moir.

Cummings, Peter, Engineer, U. S. Chromium Company, Pitt and Wallace Streets, Wilkinsburg, Pa. Recommended by William R. Gellatly.

Dean, W. H., Division Storekeeper, B. & O. R. R. Co., 1224 Sycamore Street, Connellsville, Pa. Recommended by T. E. Britt.

Diepeveen, Cornelius, Sassenheim, Netherlands. Recommended by G. M. Sixsmith.

Dierker, R. H., Agent, B. & O. R. R. Co., "Braddock", R. D. No. 2, Allison Park, Pa. Recommended by T. E. Britt.

Evans, Charles S., Chief Car Service Clerk, Donora Southern Railroad Company, Box 133, Fayette City, Pa. Recommended by C. M. Rizzo.

Fownes, James A., Vice-President and Treasurer, Gem Manufacturing Company, 1229 Goebel Street, N. S., Pittsburgh, Pa. Recommended by William R. Gellatly.

Gandy, R. H., Mechanical Draftsman, B. & O. R. R. Co., Baptist Road, R. D. No. 1, Library, Pa. Recommended by T. E. Britt.

Goble, A. S., Baldwin Locomotive Works, Paschall Station, Philadelphia, Pa. Recommended by T. E. Cannon.

Goldcamp, C. F., Sales Department, Jones & Laughlin Steel Company, Third and Ross Streets, Pittsburgh, Pa. Recommended by H. J. Watt.

Gray, C. C., General Freight Agent, Western Maryland Railway Company, Park Building, Pittsburgh, Pa. Recommended by H. J. Watt.

Gray, M. L., Acting Vice-President, Union Switch & Signal Company, Swissvale, Pa. Recommended by C. M. Wheeler.

Gross, John, Captain of Police, B. & O. R. R. Co., 625 Churchview Avenue Extension, Pittsburgh (10), Pa. Recommended by T. E. Britt.

Groves, Walter C., Chief Engineer, Donora Southern Railroad Company, Donora, Pa. Recommended by C. M. Rizzo.

Handloser, Bertram F., General Superintendent, Dilworth Porter Division, Republic Steel Corporation, 4th and Bingham Streets, Pittsburgh, Pa. Recommended by H. J. Watt.

Harris, J. P., Chief Clerk to Division Engineer, B. & O. R. R. Co., 3429 Meadowcroft Avenue, S. H. B., Pittsburgh, Pa. Recommended by T. E. Britt.

Helmbach, A. E., Assistant Signal-Telegraph Engineer, P. & L. E. R. R., 1095 Bank Street, Beaver, Pa. Recommended by C. M. Wheeler.

Hofmann, Eugene L., Assistant Passenger Train Master, Pennsylvania Railroad, 411 Todd Street, Wilkinsburg, Pa. Recommended by Robert E. Grieve.

Jack, E. A., General Traffic Manager, Aluminum Company of America, Gulf Building, Pittsburgh, Pa. Recommended by C. M. Wheeler.

Jarden, Carroll, Sales Engineer, Sherwin-Williams Company, 105 South Water Street, Philadelphia, Pa. Recommended by William R. Gellatly.

Jarres, Frank A., Local Storekeeper, B. & O. R. R. Co., 392 West Fairview Street, Somerset, Pa. Recommended by T. E. Britt.

Keeney, A. R., Foreman Foundry, Union Switch & Signal Company, 4803 Cypress Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Kessler, A. L., Clearance Clerk, Pennsylvania Railroad, 402 Knox Avenue, Pittsburgh, Pa. Recommended by W. B. Moir.

Keys, A. H., District Master Car Builder, B. & O. R. R. Co., 1651 Potomac Avenue, Dormont, Pittsburgh, Pa. Recommended by T. E. Britt.

Kirk, Charles C., Supervisor Reg. Express, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Larson, W. E., Vice-President, Superior Railway Products Corporation, 7501 Thomas Boulevard, Pittsburgh, Pa. Recommended by William R. Gellatly.

Loder, C. C., Sales Engineer, Plibrico Jointless Firebrick Company, 298 Duquesne Way, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Marble, A. E., Metallurgical Department, Jones & Laughlin Steel Corporation, 3rd Avenue and Ross Street, Pittsburgh, Pa. Recommended by H. J. Watt.

Metzger, C. L., Secretary, Auto-Tite Joints Company, 7501 Thomas Boulevard, Pittsburgh, Pa. Recommended by William R. Gellatly.

Miller, R. E., General Engineer, Westinghouse Air Brake Company, Wilmerding, Pa. Recommended by W. B. Renshaw.

Morris, W. F., Jr., Vice-President, Weirton Steel Company, Grant Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Morse, J. W., Assistant Trainmaster-Assistant Road Foreman of Engines, Pennsylvania Railroad, 303 N. Fourth Street, Youngwood, Pa. Recommended by W. R. Triem.

McAndrews, T. E., Assistant General Freight Agent, Erie Railroad Company, Gulf Building, Pittsburgh, Pa. Recommended by H. J. Watt.

Oehlschlager, W. A., Engineer, Union Switch & Signal Company, Crescent Hills, R. D. 1, Wilkinsburg, Pa. Recommended by C. M. Wheeler.

Pearl, W. W., Section Stockman, Stores Department, B. & O. R. R. Co., R. D. No. 2, Box 411, Connellsville, Pa. Recommended by T. E. Britt.

Porter, H. N., Piece Work Inspector, P. & L. E. R. R., Box 5, Glenwillard, Pa. Recommended by A. V. Hilstrom.

Roberts, E. L., Chief Clerk, Donora Southern Railroad Company, 457 McKean Avenue, Donora, Pa. Recommended by C. M. Rizzo.

Rowan, J. R., Salesman, J. B. Ford Company, 501 Fulton Building, Pittsburgh, Pa. Recommended by T. E. Britt.

Rys, C. F. W., Assistant to President and Metallurgical Engineer, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by C. W. Trust.

Satterfield, A. T., Section Stockman, Stores Department, B. & O. R. R. Co., 2918 Claremont Avenue, Brentwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Schad, J. W., Division Master Mechanic, B. & O. R. R. Co., Glenwood, Pittsburgh, Pa. Recommended by J. D. Beltz.

Schako, E. J., Shop Superintendent, Superior Railway Products Corporation, 7501 Thomas Boulevard, Pittsburgh, Pa. Recommended by William R. Gellatly.

Servais, F. W., Signal Stockman, Stores Department, B. & O. R. R. Co., 503 Johnston Avenue, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Sipe, D. A., Supervisor Track, Pennsylvania Railroad, 6373 Stanton Avenue, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Starke, H. F., General Agent, Southern Pacific Lines, Gulf Building, Pittsburgh, Pa. Recommended by H. J. Watt.

Stevenson, W. M., District Representative, Railway Department, Crucible Steel Company of America, 1258 East 55th Street, Cleveland, Ohio. Recommended by W. B. Moir.

Stewart, C. D., Chief Engineer, Westinghouse Air Brake Company, Wilmerding, Pa. Recommended by J. B. Wright.

Taggart, Ross E., Field Engineer, P. & L. E. R. R., 2733 Amman Street, S. H. B., Pittsburgh, Pa. Recommended by G. H. Burnette.

Tobasco, P., Section Stockman, B. & O. R. R. Co., 295 Baldwin Road, Hays, Pittsburgh, Pa. Recommended by T. E. Britt.

Van Woert, F. E., Vice-President and General Superintendent, Donora Southern Railroad Company 137 Ida Avenue, Donora, Pa. Recommended by C. M. Rizzo.

Walter, H. L., Freight Representative, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

PRESIDENT: We are glad to welcome you into the Club and we hope you will get as great advantage out of your membership in the Club as we expect to get from your association with the Club.

I have here a report of the Membership Committee, of which Mr. Watt is Chairman. He is unable to be here tonight and asked me to present his report to you. Therefore I will read the report and give you a brief analysis of the work of the Committee, which will be of interest as follows:

Membership reported October 25, 1934		746	
New members, November, 1934	169		
New members, December, 1934	69		
New members, January, 1935	53		
Reinstated	19		
		310	
		1,056	
Resigned	10		
Loss of Address	2		
Died	5		
		17	
Present membership			1,039
New applications, February 28, 1935			61
			1,100

I had asked the Membership Committee to try and have our membership reach 1,100 by the time of this meeting. It is a coincident that we have exactly that number of members tonight.

I may say in connection with the resolution we adopted at the December meeting, when we had 116 delinquent members, that we have reinstated all but 20 and before the evening is over we will get further returns. In addition we reinstated 19 who had been dropped from the rolls, so we are very glad to see the results that have been secured through that resolution.

That is fine. I know you will be very happy about it, as I am. We cannot have a going club without members. The first thing we have to get is members. The second is a general activity on the part of the membership, and the attendance we have tonight is a substantial indication of such activity. I want to congratulate not only the Membership Committee but also the Reception Committee for this very wonderful result. I am sorry Mr. Watt could not be here to enjoy the occasion.

We have another Committee, whose chairman also had to be out of the city tonight. Last year we appointed an Advertising Committee, of which Mr. E. A. Foard is Chairman, Mr. Passmore and Mr. Berg being the other members of the Committee. They started out to get a little advertising budget together, the ultimate plan being to finance the entire cost of printing the Proceedings from the advertising returns. The report of Mr. Foard will tell you what they have done:

Pittsburgh, February 26, 1935.

Mr. R. H. Flinn,
President, Railway Club of Pittsburgh.

Business which will take me out of the city makes it impossible for my attendance at the monthly meeting of the Railway Club of Pittsburgh on February 28th. This is regretted because I hate to miss the enjoyable and educational meetings which have been held in recent months, and I am sure that the February 28th meeting will be no exception to this rule.

Your Advertising Committee has held an organization meeting and each of the members has a very definite program to follow in the sale of advertising space in the "Official Proceedings" of the Club. Our efforts to date have resulted in seven advertisers buying space with gross sales of $200.00. This amount, together with renewed advertising, now makes a gross income from advertising of approximately $850.00 annually.

We are very actively after other accounts and hope to close some more contracts in the very near future. It is the objective of your Advertising Committee to secure a sufficient amount from advertising in the "Proceedings" to meet the entire cost of printing and mailing the "Proceedings" to members during the year, and no effort will be spared to reach this objective.

Of course, the Committee needs the help of all members of the Club, and we would be very appreciative if any member, who knows of an advertising prospect, would get in touch with any of the three members of the Advertising Committee and pass such information along so that we might get busy.

E. A. FOARD,

Chairman, Advertising Committee.

PRESIDENT: That again I think is a very auspicious start on the part of a new committee in the activities of the Club and I am confident we will have a very much more substantial accomplishment to report in the next few months.

Are there any announcements, Mr. Secretary?

SECRETARY: Since our last meeting we have received information of the death of two of our members, F. E. Symons, President, Ralston Steel Car Company, Columbus, Ohio, died January 23, 1935, and W. J. Allan, Treasurer, Commissary Company of America, Pittsburgh, died February 23, 1935.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings.

There is just one other thing that I want to say in connection with this membership campaign. The Secretary calls attention to the fact that while we have been engaged in a campaign for new members and getting delinquent members reinstated, some of the members who are still in good standing are nevertheless short on 1935 dues, and he urges that those who have overlooked paying the 1935 dues will call it to mind the next time they see their check book.

That reminds me of something I picked up the other day. Most of us—at least I hope so—are busy trying to make out our income tax report blank. I picked up a newspaper the other day in which was printed a letter that had been sent to the Secretary of the Treasury and I got such a great laugh out of it that I am going to read it to you. It was quoted from the Wall Street Journal and was printed in the Oil City Derrick of February 22:

DISGUSTED

The Department of Internal Revenue is in receipt of the following letter, according to the Wall Street Journal:

Secretary of the Treasury, U. S. Treasury Department,
Washington, D. C.:

Gents—The inclosed form, on which I am asked to make a record of my income for the last fiscal year, is returned to you with my respects and my deepest appreciation of this subtle form of flattery. I was particularly impressed by its resurrections of old forms and figures of English speech, such as "compensation from outside sources," "net profit received," "income from rents," "interest on bank deposits," etc.

The question I got a great laugh out of was, "Were you during the taxable year supporting in your household one or more persons related to you?" Boy, that's a honey.

Say Mister Secretary, you would be surprised. There are so many persons closely related to me staying at my house that I am what you would call surrounded. Only the other day, three more distant cousins of my wife's blew in, making a new high for the movement. And one of them brought a friend.

For the last four years my house has been full of strangers, all claiming to be my cousins or aunts or something. I can't identify half of them, and what burned me up was when my wife's Uncle Jerry, who has been living with us for a year, slapped me on the back the other day and asked, "Haven't I seen you some place before?"

The blank says it will allow me $400 for each dependent relative, and I would say the government is overpricing them, as I would trade the entire lot for $11 and throw in a pair of bicycle pants and a magic lantern. (Two of my wife's aunts you can have for the asking).

Heigh-ho and lackaday! The blank also asks me to "describe your business as provided in Item 2," and I am glad to answer, "Lousy, Mister Secretary, lousy." And it asks me to "enter on line 1 of Schedule A my total receipts." I wish you would stop joking, Mister Secretary. Fun is fun, but enough is enough, and you can carry anything too far.

Then you say something about allowance for "obsolescence, depreciation and depletion." That's where I come in. As an American business man, I am a study in obsolescence. I am depleted, deflated, depressed, denatured, denounced, deranged and dejected. And so is my old man. Yours in a barrel.

(Signed) ——————————

PRESIDENT: If there is no further business to come before the meeting, we have planned a little departure from the regular procedure. Instead of a regular paper, we decided that we had pumped enough education into you fellows until you were up to the limit of capacity, and we would give you something along the line of entertainment and amusement. Through the courtesy of one of the members of our Reception Committee, Mr. J. C. Shingledecker, of the Pennzoil Company, we are enabled to see a very unusual moving picture, showing among other things the record breaking trip of the Union Pacific Streamlined Train across the country, and some other things along similar lines which will be equally interesting. He endeavored to get this picture for our last meeting, when Mr. Fetters gave his paper on the Union Pacific train, but we could not get it. I will ask Mr. Shingledecker to take charge of the presentation of this feature.

MR. J. C. SHINGLEDECKER: I am delighted to be here tonight to be with old friends and make some new ones. I am not going to take up your time with talk. It is a sincere pleasure to be able to contribute to your entertainment with our sound picture and I will take this opportunity to introduce to you the man who really made the picture possible for this meeting—Mr. Earl Atkins. Ten years ago, we were both brakemen, smashing up box-cars. Today we are proud to be associated with The Pennzoil Company. Mr. Atkins will tell you a bit about the picture.

MR. T. E. ATKINS: I am very pleased to be with you tonight and enjoy your fellowship and to take part in this entertainment. We think we have something that will be interesting as well as educational. We are going to show you speed, by automobile, train, aeroplane, practically every form of speed that can be put on a film. The picture is both with sound and talking, and is entitled "Farther, Faster and Safer." We hope you will enjoy it as much as we enjoy presenting it to you. I thank you.

NOTE:—The following story was contributed a few days following the meeting.

FARTHER—FASTER—SAFER

By J. C. SHINGLEDECKER,
Supervisor of Service Stations, The Pennzoil Company

Fellow Members of the Railway Club of Pittsburgh:

This Club has more than 1,100 members scattered over 48 states and in foreign countries, who were unable to attend the February meeting. I will attempt to describe "Farther, Faster, Safer", a motion picture with sound presented by The Pennzoil Company of Oil City, Pa., the largest producer, refiner and marketer exclusively of pure Pennsylvania petroleum products in the world.

The picture was introduced by Mr. Earl Atkins, Pittsburgh manager of that company. Thousands and thousands of feet of film were ground out from the Atlantic to the West Coast and the best pieces lifted to make this sound-movie. Some were taken on water, some in the air, and occasionally the camera man came down to earth. A volume could be written about many of the scenes portraying historical backgrounds, of thrills and adventure, of the development of this vast industry and how it actually lubricated this nation on to a record of progress.

When the oil industry was born 75 years ago there were only 31,000,000 people in these United States, no automobiles, no airplanes and few trains.

This orbit on which we live has been spinning around so long and so fast it is no wonder everything on it seems to be a bit dizzy at times, but its speed is one thing to which lubricating men can lay no claim. Neither have they had anything to do with the speed of light and sound.

But speed as it is related to all things mechanical is theirs. Many of the thrills and much of the adventure which man packs into his romance of life are coupled with speed. For ages and ages he has been working his brain and gambling his life to devise some mechanical means by which he can transport his body through space faster and farther but, never satisfied, he is constantly seeking "more speed" — that alluring, captivating something always just beyond his grasp. In a few thousand years he has been able to increase his own travel from a few miles to more than 400 miles an hour.

Length and speed of travel was once limited to the endurance of his own legs and body. Kings rode on the backs of slaves, but they could go no faster than the legs of their subjects could move. It may have been that tired feeling creeping upon the human race, or the desire to go places and do things, which prompted man to climb on the backs of camels, donkeys, and elephants. He seemed to be satisfied with that sort of transportation for hundreds of years. On water he rowed, rowed along until he stuck up a sail in a stiff wind and got a thrill. A cart was fashioned and an ox hooked to it. The wheels squeaked so annoyingly he took the fat of an animal and placed it on the axles.

That was the first lubrication in industry, and that is where this picture starts—with a team of oxen bumping a cart over a rough road.

Someone, someplace, sometime back, caught a wild horse and eventually succeeded in staying on its back, and man was able to move through space at a speed of 20 or 30 miles an hour. He had reasons to believe he was really getting someplace. Horses played an important part in transportation and can still do a lot for man—if he bets on the right one.

The picture takes us back beyond the middle of the past century. A tired span drawing a lumbering, covered wagon emerges from a virgin forest somewhere in Pennsylvania. It is loaded with all the worldly possessions of a hardy, courageous people moving west over newly-broken trails to live and breathe life into a great industrial nation. They may be your forefathers. They may be mine. To lighten the load, men, women and children walked, their feet bleeding. At times they gave up in despair, lay down and prayed that they could die. My grandmother told me about it. Probably yours did, too, and it won't hurt us a bit to give them a thought as we speed down a smooth boulevard to work in a comfortable automobile, through the air at four miles a minute or over steel rails at two. Covered wagons covered the length and breadth of this continent. Those who drifted into the northwestern part of Pennsylvania found a dark green fluid seeping from the earth. They called it oil. It made light and heat.

Across the screen a little engine chugs along, dragging a string of carriages on flanged wheels at the amazing speed of 10 miles an hour. That was the first train. A horse was ridden ahead of the engine to warn people of its approach.

Zip! Across the screen a train streaks at two miles a minute. A hundred years have passed in half a blink! Ab Jenkins spins along in an automobile at 133 miles an hour—and there is an air liner doing four miles a minute. We begin to realize we are living in the age of "Farther, Faster, Safer".

The Pennzoil Company didn't send their photographer out 100 years ago to get those oxen, that covered wagon and the first train. Those things leaped from their frames in art galleries to perform.

The machine age didn't wait for the discovery of oil for fuel and lubricants. After man succeeded in harnessing steam, he filled the firebox with wood and greased the axles with animal fat. The engineer tooted the horse off the track and the machine age really got going. Man had the power to go farther and faster, but the animal fat would not hold up and progress was impeded.

The covered wagon emigrants sopped up oil with blankets for years and years along Oil Creek from Oil City to Titusville before Colonel Edwin L. Drake happened along. Historians might be able to trace doughnut-dunking right back to that soaking-up idea of those early settlers. Men all over the world were still searching for the vast hordes of gold hidden by Captain Kidd, but Colonel Drake turned his genius on another treasure.

He brought "Uncle Billy" Smith, a driller, from Tarentum to Titusville with a homemade iron bit. They bounced it down into the earth some 69½ feet on the bank of Oil Creek and struck oil. Last August 27 oil men from all parts of the world went there to celebrate the seventy-fifth anniversary of the discovery of that treasure, which opened the door to the greatest and fastest development of wealth and progress ever made by any country on earth.

From that well the original oil field of the world was dedeveloped. Hundreds and thousands of holes were pierced, deeper and deeper. The field spread far and wide through Western Pennsylvania, but its limits reached only into Southwestern New York, Southeastern Ohio and Northern West Virginia. Oil was discovered in mid-continental states, on the west coast and in all parts of the world, but none to match the high quality of the crude which comes from the Pennsylvania field.

Colonel Drake discovered his treasure right in the cream of the whole world's crop. It has never changed. It will never change. Its base is pure paraffin, unlike any other ever found, which makes it supreme in quality for lubricating purposes. There are various kinds and qualities of Pennsylvania crude, the finest of them all coming from the Oil City-Bradford district where the Colonel hit the bullseye for the green-gold jackpot.

There was a wild scramble in those parts, and the price of crude oil fluctuated from 10 cents to $20 a barrel between 1860 and 1880. Fortunes were made and lost. Men went broke, but they were still men. They went back and got rich again.

Thousands were experimenting with the stuff to discover what it could do. It made light, heat and furnished power, and when the lighter parts were separated by heating methods the heavy deposits were good for lubricating purposes. The brains of scientists and engineers, as they are known today, are still discovering new things which crude oil can make and do, but their attention is devoted largely to the development of its lubricating qualities. Properly refined, it has tremendous heat resistance and at the same time will flow and lubricate in cold temperatures, as is demonstrated by the Condor planes of Eastern Airways, Inc., which fly between the cold north and hot south with the same oil.

Among the pioneer refiners were Messrs. Charles L. Suhr, now president of The Pennzoil Company; Daniel J. Cavanaugh, treasurer and director of the Company who recently retired from active duties, and R. A. Browne, a director in the same Company.

These men attempted to make something of the stuff and of themselves at the same time, and succeeded in both. They set up crudely-devised refining units which consisted of almost any vessel that would hold oil, and were able to reduce the crude petroleum to a heavy, sticky form that was just the thing teamsters needed for the axles of their wagons, and it lubricated railway cars and other kinds of machinery. They had no laboratory and not much of a refinery, but they did the best they could with what they had. Coal oil and axle grease were their chief products, but as time passed new products were made from crude oil and line after line of products was marketed.

Then came the internal combustion engine and the automobile. They needed lighter fuel than coal oil, and lubricants, too. One trouble was that the oil would not flow in cold weather, so Suhr, Cavanaugh, Browne and their associates pioneered with a process to remove some of the wax which caused oil to solidify in cold temperatures. That worked, and the motorist was able to crank his car in cold weather.

Those men worked long hours to keep step with the machine-builders, who constantly added to their worries by fashioning new-fangled gadgets to put on automobiles. Their sole efforts were devoted to producing products that would keep metal from touching metal.

One day Suhr, Cavanaugh, and Browne discovered they had the finest laboratory in the world for developing Pennsylvania crude oil, and the most modern refinery through which coursed only the finest of crude oil. Making money was necessary, of course, but first in their minds was making lubricants and gasoline. After almost endless years of experimenting they succeeded in building into their lubricating oil a film so tough it would not break under pressure or heat, and most of the motorists' troubles were over. They stood at the finish line with the mechanical engineers at the conclusion of every test.

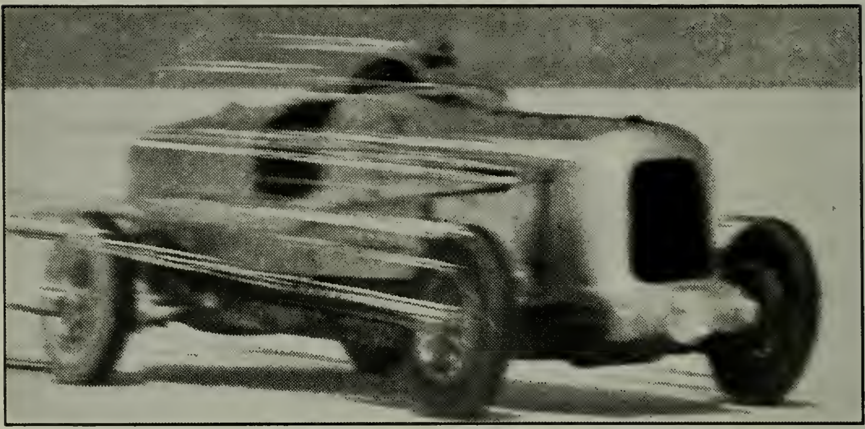
What next was the mechanical engineer going to demand of them? Men wanted to go farther, faster, safer. What could they further do to improve the product of their life's work? After a half century they realized their time was limited. Good as their lubricant was, the chemists saw something in it which, if removed, would make the oil last longer, flow freer and lubricate better. How to reach it was the problem.

One bright, sunny morning there was a stir in the laboratories. Telephones jangled. Messrs. Suhr, Cavanaugh and Browne were happy. They had it—a new solvent process by which non-lubricating, sludge-forming substances—the "devils of the oil"—were removed.

The layman probably will never know, but reaching that useless stuff and getting it out makes his automobile, airplane or what-have-you run farther, faster, safer and a darned sight cheaper. The removal of that 10 per cent of harmful material has made the lubricant 33 per cent better, according to college laboratories.

The new oil was used in trains, planes, automobiles and every kind of moving mechanical thing to test its practical performance. Farther! Faster! Safer! It worked! Movie men went out with sound apparatus to capture new speed records on film and bring them back with all the natural hissing, sizzling and roaring of those fast-moving vehicles in the air, and on the land, and on water.

Ab Jenkins tears right down through that film in a tractor at 65 miles an hour for a new tractor record while old Dobbin snorts with envy in the barn and probably remembers the day the locomotive tooted him off the track. Hardly is the tractor hooked to a plow before Ab is adjusting his goggles in his Pierce Arrow Special over a 10-mile, measured track on the great salt beds of Utah to smash the world's records he hung up at the same place in 1933, when he drove an automobile 24 consecutive hours at any average speed of 117 miles an hour, and added four other records to them.



Ab. Jenkins, famous racer, driving his Pierce Arrow Special at 133 miles per hour on the Salt Beds in Utah, lubricated with Pennzoil S. A. E. 20.

His motor roared. American Automobile Association officials started their electric time clocks, and he was off. Around and around he went at an average of 133 miles an hour for the first five hours. He wrote a letter, he chewed gum, but he never slowed down until his fuel ran low.

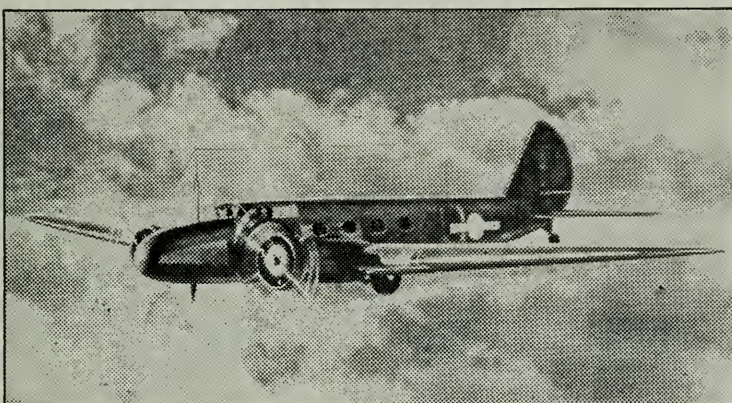
Flares set 200 feet apart marked the course as night settled over that field of salt. They flashed by, one each second, all night long. At noon next day he was flagged down after he had covered 3,000 miles in 23½ hours at an average speed of 127 miles an hour, setting 11 world's records.

That was a long trip on two bottles of milk and a package of chewing gum! The camera man removes one camera from the racing machine, another from the plane in which he rode along side Ab to see what he was doing on the far side of the course, and still another he digs right out of the track where he could let you know how it feels to be run down by a racing car at 130 per.

Another wink or two, and we are over on the Pacific coast. The conductor yells "all aboard" and we are off in the Union Pacific streamlined train as it dashes out of Los Angeles. W. A. Harriman is aboard. He is out to break the 28-year-old transcontinental rail record established by his father, the late E. H. Harriman.

Over the Rockies and across the plains that rail bullet streaks along at 120 miles an hour, with the camera man in a plane one second, on a bridge under which it passes the next, hanging out a vestibule, and then burying himself under the track to take the bottom of the train as it passes over.

Omaha, Chicago, Cleveland and New York, all in 57 hours, breaking all records! The Pennzoil engineer who was a passenger hopped off, proud not only because he lives in California, but because his oil lubricated the giant diesel engines, and every moving part on the train.



One of the Pennzoil Lubricated Air Liners.

But right back to the Pacific coast we go in less than a wink, and find ourselves looking at a United Airlines Transport Corporation plane dashing down the runway, off for New York. Then we get into the plane and look down upon Salt Lake City, but transfer quickly to another to picture that beautiful, trim palace of the air against a Rocky Mountain background. There is the Mississippi still rolling along. We look up and we are in Chicago, where passengers alight and others enter. We skirt the shore of Lake Erie, take a look at Cleveland, and order a malted milk. It is gone. We look for the hostess—and there is the Statue of Liberty! A lot of traveling in a few minutes, but we can't stop.

The Sikorsky Company has just completed a giant, 19-ton, 32-passenger flying boat. We reach the bay as its four powerful motors roar. We jump into a fast motorboat and trail along. We can't keep up. It is making 60 miles an hour on the water. It leaves the water. It flies! It is up in the air doing 160 miles an hour and brings 10 speed records back from Europe to the good old U. S. A. It comes down, and we hold our stomachs as it hits the water.

You have already made two trips across the continent, but here is another just as thrilling. We are in Los Angeles. That is Captain Eddie Rickenbacker seated across our table beside a new Douglas transport plane. He is eating breakfast and tells us he hopes to eat dinner in New York. There are just as good eating places along the line, but Eddie, that great war ace, wants to eat in the big town and doesn't want to be late, either.

We're off! Up—up—up—15,000 feet. The air is thin, but it isn't hot. Don't worry. We are high enough to miss Pike's Peak and all those other proud offspring of the Rockies. There is the Empire State Building, and there is the Waldorf. The chef is ringing the dinner bell and we are just 12 hours and seven minutes from California.

We thought we were through, but no—here we are at the Newark airport, where planes are coming and going all the time, and wondering where we are going next. The camera man won't tell. Out rolls one of those big, beetle-like Condor flying ships and we are off to Florida, where we are abandoned.

Not a bad place to be deserted at this time of year, but proud that our own great state of Pennsylvania has given the world a product that will lubricate any machine at any speed for years to come—farther, faster, safer!

PRESIDENT: We want to thank Mr. Shingledecker and Mr. Atkins for this enjoyable and instructive entertainment.

Our Music Committee, under the direction of Mr. J. Porter Gillespie, has prepared a program for your approval. I feel quite certain you will be interested in it. We will now turn the meeting over to Mr. Gillespie.

MR. FRANK E. WEIS: We have an entertainment for you tonight which I am sure you will appreciate. This was conceived entirely by the Chairman of the Music Committee, Mr. J. Porter Gillespie. He is the main man in the show. The other boys are all members of the Railway Club of Pittsburgh. This is supposed to be a little burlesque in connection with a very important subject, which you will recognize as soon as the show starts.

The stage was set as the rear end of a limited train, with porters, trainmen and conductor. The dialogue was bright and witty and the music was enjoyable in every respect.

Black-face Quartette (dressed as Pullman Porters),
C. W. Koche (Clerk, P. & L. E. R. R. Co.)
M. L. Bishop (A. R. A. Clerk, P. & W. Va. Ry. Co.)
Charles H. Hemma (Draftsnman, P. & L. E. R. R. Co.)
G. E. Goldstrom (Draftsman, P. & W. Va. Ry. Co.)
D. E. Byham (Stockman, Pennsylvania Railroad)
B. M. Swope (Superintendent Motive Power, Pennsylvania Railroad)
Brice Waxler (Clerk, Pennsylvania Railroad)
George L. Rushneck (Draftsman, P. & L. E. R. R. Co.)
Frank E. Weis (Transportation Clerk, Pennsylvania Railroad)

Mrs. Frank E. Weis, Pianist.

Evening by the Moonlight............Quartette
Some Folks Say That a Nigger Won't Steal......Quartette
I've Been Workin' on the Railroad............Quartette
Home on the Range............D. E. Byham (Everybody Join in Chorus)
Down By the Old Mill Stream............Brice Waxler
No, No, a Thousand Times No............G. E. Goldstrom
Road to Mandalay............Charles H. Hemma
Dinah............M. L. Bishop
Wreck of the Old Ninety-seven............
Frank E. Weis, George, L. Rushneck, G. E. Goldstrom
Duet—Mouth Organ, Frank E. Weis; Jewsharp, Geo. L. Rushneck.
Clog Dance.........Harold Paul, Messenger, Penna. Railroad

PRESIDENT: I am sure you all will agree that this first effort of our Music Committee in putting on this musical show has been a great success, and I am ready to entertain a motion to extend a vote of appreciation to them for their splendid entertainment.

ON MOTION a vote of thanks is extended to the Music Committee and the men who have taken part for the very fine entertainment.

PRESIDENT: I may state that we started out some three or four months ago to gather together the talent in this Club, both vocal and instrumental and otherwise, and I think it is very evident to you that we have plenty of talent in the Club to put on any kind of entertainment, and I for one have thoroughly enjoyed the entertainment tonight.

Before we proceed to the refreshments I have one or two announcements to make. You may have noticed this little sign on the table in front of me, the inference to be drawn from it being that every member ought to get a member. To facilitate the movement the Membership Committee has arranged to have printed on the page of the Proceedings in front of the title page an application blank, printed right in the book, and we want to urge all of you to use your best effort to bring a new member into the Club. Merely because we have 1100 members is no reason why we should stop there. We do not want to stop anywhere because we do not believe that we will ever reach the limit of our possible usefulness. We want to keep on. You seem to enjoy coming to these meetings, for we have the largest attendance tonight that we have ever had at any time excepting at the annual smoker, and we are going to make all of the meetings give you just as good value for your money as we are giving you tonight. We hope the innovation tonight has been pleasing to you.

If there is no further business, the luncheon is waiting and a motion to adjourn will be entertained.

ON MOTION: Adjourned.

J. D. CONWAY, Secretary.

In Memoriam

F. E. SYMONS,

Joined Club May 26, 1927

Died January 23, 1935

W. J. ALLAN,

Joined Club April 24, 1919

Died February 23, 1935

SCRIBBLITZ

Few, if any, Organizations give so much for the small annual membership payment required.

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That because membership payment is small is no valid reason why it should not be paid when due.

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*   *   *   *   *

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OFFICIAL PROCEEDINGS
RAILWAY CLUB OF PITTSBURGH
$1.00 Per Year 25¢ Per Copy

Vol. XXXIV. MARCH 28, 1935. No. 5.

"RAILROADS AND THE NATIONAL WELFARE"

By MR. JOHN M. FITZGERALD, Vice-Chairman,
Committee on Public Relations of the Eastern Railroads,
Eastern Presidents' Conference ,New York City

The proof of your interest

in the Club can be

enhanced

by securing a

NEW MEMBER.

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it up and

"ACT NOW."

OFFICIAL PROCEEDINGS
OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 5

Pittsburgh, Pa., March 28, 1935

$1.00 Per Year
25c Per Copy

INDEX—ADVERTISERS.

NOTE—This form to be filled out in full by typewriter or printed and mailed to J. D. Conway, Secretary, 1941 Oliver Building, Pittsburgh, Pa. Membership fee, including dues, is $3.00 for each fiscal year or part thereof, except those propesd in September or October. Those proposed in these months will be credited upon payment for the following fiscal year. Dues are payable in advance.

The fiscal year ends with the month of October.

The Railway Club of Pittsburgh:

....19..........

Gentlemen:

Will you kindly consider my Application for Membership in your Club at the next meeting:

Name..

Title..

Company..

My Address..

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Recommended by..

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Vol. XXXIV No. 5 | Pittsburgh, Pa., March 28, 1935 | $1.00 Per Year 25c Per Copy

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WILLIAM R. GELLATLY, President, Superior Railway Products Corp., Pittsburgh, Pa.
P. W. HEPBURN, Sales Engineer, Gulf Refining Company, Pittsburgh, Pa.
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C. W. TRUST, Assistant Traffic Manager, Carnegie Steel Company, Pittsburgh, Pa.
CHARLES M. WHEELER, Sales Engineer, Union Switch & Signal Co., Swissvale, Pa.

PAST PRESIDENTS:

*J. H. McCONNELL.....October, 1901, to October, 1903
*L. H. TURNER.....November, 1903, to October, 1905
*F. H. STARK.....November, 1905, to October, 1907
*H. W. WATTS.....November, 1907, to April, 1908
*D. J. REDDING.....November, 1908, to October, 1910
*F. R. McFEATTERS.....November, 1910, to October, 1912
*A. G. MITCHELL.....November, 1912, to October, 1914
*F. M. McNULTY.....November, 1914, to October, 1916
J. G. CODE.....November, 1916, to October, 1917
*D. M. HOWE.....November, 1917, to October, 1918
*J. A. SPIELMAN.....November, 1918, to October, 1919
H. H. MAXFIELD.....November, 1919, to October, 1920
FRANK J. LANAHAN.....November, 1920, to October, 1921
SAMUEL LYNN.....November, 1921, to October, 1922
D. F. CRAWFORD.....November, 1922, to October, 1923
GEO. D. OGDEN.....November, 1923, to October, 1924
A. STUCKI.....November, 1924, to October, 1925
F. G. MINNICK.....November, 1925, to October, 1926
G. W. WILDIN.....November, 1926, to October, 1927
E. J. DEVANS.....November, 1927, to October, 1928
W. S. McABEE.....November, 1928, to October, 1929
E. W. SMITH.....November, 1929, to October, 1930
LOUIS E. ENDSLEY.....November, 1930, to October, 1931
*JOHN E. HUGHES.....November, 1931, to October, 1932
F. I. SNYDER.....November, 1932, to October, 1933
C. O. DAMBACH.....November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING
MARCH 28, 1935

The meeting was called to order at the Fort Pitt Hotel at 8 o'clock, P. M., with President R. H. Flinn in the chair.

Registered attendance, 357, as follows:

MEMBERS:

Adams, Frank W.
Allen, Harvey
Ambrose, W. F.
Ament, F. C.
Anderson, G. S.
Anderson, H. N.
Armstrong, C. B.
Ashley, F. B.
Aulbach, A. J.
Babcock, F. H.
Baer, H. L.
Baker, W. E.
Barnhart, B. F.
Barr, H. C.
Baughman, G. W.
Baumann, E. G.
Beam, E. J.
Beaver, J. B.
Beeson, H. L.
Beltz, J. D.
Berg, Karl
Beswick, R. M.
Bishop, M. L.
Bonhoff, E. L.
Britt, T. E.
Buchanan, C. C.
Bucher, Fred J.
Buck, E. R.
Buck, L. L.
Buffington, W. P.
Burel, W. C.
Burnette, G. H.
Buzzerd, J. P.
Cannon, T. E.
Carmack, J. L.
Carmody, J. J.
Carson, John
Carter, S. T.
Chipley, G. R.
Christy, F. X.
Christy, G. J.
Clardy, W. J.
Clark, C. C.
Clark, H. C.
Clowes, W. K.
Code, J. G.
Coombe, A. B.
Conway, J. D.
Courtney, Harry
Crenner, J. A.
Cruikshank, J. C.
Dalrymple, R. W.
Dambach, C. O.
Davies, James
Davis, Charles S.
Dean, E. E.
Dean, W. H.
Dickson, K. B.
Downes, D. F.
Downing, J. A.
Eaton, Frederick H.
Edwards, Walter
Egly, M. J.
Emery, E.
Endsley, Prof. Louis E.
Escott, Charles M.
Evans, Robert E.
Fair, J. M.
Farlow, G. B.
Finegan, Thomas A.
Fischer, John G.
Flinn, R. H.
Folan, J. V.
Forsythe, George B.
Fox, M. C.
Fralic, C. F.
Frauenheim, A. M.
Frauenheim, Pierce
Freshwater, F. H.
Fults, J. H.
Furch, C. J.
Gandy, Ralph H.
Gatfield, Phillip
Gilbert, William J.

Gilg, Henry F.
Gillespie, J. Porter
Glaser, J.P.
Glenn, J. H.
Goble, A. S.
Goda, P. H.
Goldcamp, C. F.
Goldstrom, G. E.
Grieve, Robert E.
Gross, John
Groves, Walter C.
Grunden, B. C.
Hansen, William C.
Harper, G. C.
Harper, J. T.
Harris, J. P.
Hayward, Carlton
Heed, H. L.
Hemma, Charles H.
Hilstrom, A. V.
Hofmann, E. L.
Holland, S. E.
Holmes, E. H.
Honsberger, G. W.
Hoopes, R. E.
Hoover, J. W.
Hopper, George
Huber, H. G.
Huff, A. B.
Hunt, Lawrence
Hykes, W. H.
Jarres, Frank A.
Johnson, Ira S.
Johnson, J. W.
Keck, L. M.
Kelly, L. J.
Kentlein, John
Kerr, Charles, Jr.
King, E. C.
Knable, G. E.
Koch, C. W.
Krahmer, E. F.
Kramer, W. E.
Kramer, W. H.
Kraus, Raymond E.
Krause, H. A.
Kruse, J. F. W.
Kulp, J. G.
Lanahan, Frank J.
Larsen, W. E.
Lear, E. J.
Lehr, Harry W.
Lewis, Herbert
Lincoln, J. J., Jr.
Lloyd, John
Loder, C. C.
Lowry, William F., Jr.
Lundeen, Carl J.
Lynn, Samuel
Meinert, Henry J.
Merz, G. L.
Miller, W. J.
Moir, W. B.
Morgan, Homer C.
Mowery, George B.
Murray, C. C.
MacDonald, W. C.
Mahaney, A. R.
Marble, A. E.
Marsh, E. A.
Mayer, L. I.
Millar, C. W.
Mills, O. B.
Misner, George W.
Mitchell, W. S.
Montague, C. F.
Moore, Donald O.
Mulvey, J. I.
Munn, Alex D.
McAbee, W. S.
McCormick, E. S.
McCrossin, C. D.
McGeorge, D. W.
McGervey, William P., Jr.
McHail, J. L.
McIntyre, R. C.
McKenzie, Eward F.
McKinley, J. T.
McLaughlin, H. B.
McMillan, A. P.
McNamee, William
McQuiston, C. A.
Nichols, Samuel A.
Norris, J. L.
Oehlschlager, W. A.
O'Leary, J. J.
Orchard, Charles
Osborne, Raymond S.
O'Sullivan, J. J.
Passmore, H. E.
Pearl, William W.
Prichard, Hugh R.
Pringle, H. C.
Posteraro, S. F.

Purchard, Paul
Quinn, John J.
Reynolds, A. C.
Richardson, Fred
Rief, Joseph
Roberts, E. L.
Robertson, A. S.
Rowles, H. N.
Rushneck, G. L.
Rutter, H. E.
Ryan, D. W.
Ryan, J. M.
Satterfield, A. T.
Schadt, A. D.
Schaffer, G. F.
Schako, E. J.
Schauers, Robert W.
Schiller, Joseph
Schmidt, F. C.
Schmitt, Andrew
Schultz, D. C.
Searles, E. J.
Seiss, W. C.
Sekera, C. J.
Servais, F. W.
Shepherd, W. B.
Sheridan, T. F.
Shingledecker, J. C.
Simons, Philip
Sixsmith, G. M.
Slick, Frank F.
Smith, Charles F.
Spencer, A. C.
Stevens, R. R.
Stevenson, R. F.
Stevenson, W. M.
Stewart, J. D.
Stoecker, J. P.
Stoffregen, Louis E.
Stratford, C. T.
Sullivan, A. W.
Sutherland, Lloyd
Swope, B. M.
Sykes, A. H.
Taylor, H. D.
Ternent, H. J.
Teufel, W. O.
Thomas, H. N.
Tipton, G. M.
Trax, L. R.
Triem, W. R.
Troxell, H. R.
Tryon, I. D.
Tucker, John L.
Urtel, E. J.
Van Woert, F. E.
Vollmer, Karl L.
Vowinkel, Fred F.
Wark, James M.
Weaver, W. Frank
Weis, Frank E.
West, Troy
Wheeler, C. M.
Wikander, O. R.
Wilkinson, W. E.
Woods, G. M.
Woodward, R.
Wurts, T. C.
Wyke, J. W.
Yarnall, Jesse

VISITORS:

Abbiss, R. D.
Adams, Charles E.
Barnett, J. W.
Bass, Raymond E.
Bassett, Clarence
Becher, John W., Jr.
Black, Anna L.
Boyd, James K.
Boyd, John B.
Brown, Robert S.
Brown, Homer
Brown, W. E.
Buchner, Sarah C.
Burriss, H. E.
Byham, D. E.
Carter, Julian
Carey, C. D.
Clark, E. C.
Cockcroft, Nellie
Cotter, Jean M.
Crago, P. H.
Cramer, G. E., Jr.
Davis, William B.
Ebesberger, Frank
Edsall, S. D.
Felton, F.
Ferguson, J. M.
Fisher, Earl H.

Fitzgerald, J. M.
Fraser, Stephen
Gerg, F. E.
Geuder, A. G.
Glenn, F. R.
Goggins, J. J.
Goodwin, E. G.
Hankins, Cyrus
Harbaugh, George N.
Herbertson, Thomas
Hoerner, A. S.
Johnson, Gene R.
Jones, L. B.
Laughlin, R. B.
Lewis, S. B.
Logan, W. J.
Martin, Grace B.
Marshall, L. L.
Mercer, Alice
Motherwell, Alex
Mowery, George B., Jr.
Murdoch, James L.
Murray, T. A.
McCarthy, F. C.
McConnell, Sadie
McKnight, J. F.
McLaughlin, Rena
McRocaty, William O., Jr.
Prince, Pattie
Reynolds, D. E.
Roderick, M. C.
Nordenholt, George F.
Parkhill, Ralph N.
Pattison, W. J.
Ralston, Guy L.
Reichenbach, A. T.
Richmond, G. A.
Robitzek, A. R.
Rodee, H. H.
Ruse, George
Sargent, Florence
Saunders, Alexander
Schleindl, Frederick A.
Scott, Ella E.
Seybolt, W. H.
Shepherd, G. B.
Sherron, John
Showalter, Joseph
Smith, Iona May
Smith, Sion B.
Southwell, Edith
Spratley, Charles J.
Stauffer, C. D.
Stevenson, L. N.
Stewart, Margaret D.
Stewart, Ralph D.
Strawbridge, John T.
Trischler, Florence
Tunison, M. A.
Turner, C. B.
Vandivort, R. E.
Vogel, William S.
Vollmer, Paul F.
Wagner, W. H.
Warner, G. R.
Waxler, Brice
White, W. B.
Williams, Stewart C.
Wilson, J.
Wimer, H. B.
Yohe, J. K., Jr.

PRESIDENT: If you will come to order, we will dispose of the business session as quickly as possible.

We will dispense with the roll call, for the registration cards you have signed will take care of that.

If there is no objection we will dispense with the reading of the minutes of the last meeting, as they are already in your hands and I presume you have all read them.

We will proceed to the announcement of the new members. In accordance with our custom, those who are present will please stand when their names are called so the members of the Club may recognize you.

Anderson, M. M., Personnel Manager, Aluminum Company of America, Gulf Building, Pittsburgh, Pa. Recommended by James Davies.

Armstrong, C. B., Railway Sales Manager, Central Div., Air Reduction Sales Company, 332 South Michigan Avenue, Chicago, Ill. Recommended by T. E. Britt.

Atkins, T. Earl, Branch Manager, The Pennzoil Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by J. C. Shingledecker.

Baker, W. E., Supervisor, Pennsylvania Railroad, 51 McMunn Avenue, Crafton, Pittsburgh, Pa. Recommended by J. D. Stewart.

Bradley, J. P., General Agent, Railway Express Agency, Inc., 926 Penn Avenue, Pittsburgh, Pa. Recommended by J. W. Johnson.

Christner, L., Electrician, B. & O. R. R. Co., 2709 Queensboro Avenue, Brookline, Pittsburgh, Pa. Recommended by T. E. Britt.

Conneely, E. K., Manager of Railroad Sales, Republic Steel Corporation, 3 Linden Place, Sewickley, Pa. Recommended by Herbert J. Watt.

Critchlow, J. N., Sales Department, Union Steel Casting Company, 62nd & Butler Streets, Pittsburgh, Pa. Recommended by R. H. Flinn.

Dalrymple, R. W. Metallurgical Engineer, Jones & Laughlin Steel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Eaton, Frederick H., Sales Engineer, American Car & Foundry Company, Farmers Bank Building, Pittsburgh, Pa. Recommended by William F. Lowry, Jr.

Edwards, W. Section Stockman, Stores Department, B. & O. R. R. Co., 4714 Sylvan Avenue, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

Fischer, John G., Chief Rate Clerk, B. & O. R. R. Co., 109 Shady Drive, West, Mt. Lebanon, Pittsburgh, Pa. Recommended by T. E. Britt.

Gardner, K. C., Vice President, Greenville Steel Car Company, Greenville, Pa. Recommended by T. R. Dickinson.

Grier, M. L., Accountant, Alton & Southern Railroad, Gulf Building, Pittsburgh, Pa. Recommended by James Davies.

Grunden, B. C., Commercial Agent, Railway Express Agency, Inc., 926 Penn Avenue, Pittsburgh, Pa. Recommended by J. W. Johnson.

Heed, H. L., Agent, 26th Street Terminal, Railway Express Agency, Inc., 5742 Howe Street, Pittsburgh, Pa. Recommended by J. W. Johnson.

Hoopes, R. E., Agent, Pennsylvania Railroad, Donora, Pa. Recommended by Charles S. Evans.

Hovey, Otis, W., Engineer, Railway Research Bureau, U. S. Steel Corporation, Frick Building Annex, Pittsburgh, Pa. Recommended by C. W. Trust.

Hughes, E. H., Assistant Manager of Sales, Steel Construction Department, Jones & Laughlin Steel Corporation, Room 806, 311 Ross Street, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Johnson, Le Vere H., Executive Secretary, Pennsylvania Railroad Y. M. C. A., 28th Street & Liberty Avenue,, Pittsburgh, Pa. Recommended by E. A. Foard.

King, E. C., Route Agent, Railway Express Agency, Inc., 5801 Rippey Street, Pittsburgh, Pa. Recommended by J. W. Johnson.

Kramer, W. H., Train Rider, B. & O. R. R. Co., 203 Maytide Street, Carrick, Pittsburgh, Pa Recommended by T. E. Britt.

McDowell, C. G., Chief Route Agent, Railway Express Agency, Inc., 926 Penn Avenue, Pittsburgh, Pa. Recommended by J. W. Johnson.

McGervey, William P., Jr., Assistant to President, Union Steel Casting Company, 62nd & Butler Streets, Pittsburgh, Pa. Recommended by R. H. Flinn.

McQuiston, C. A., Commercial Agent, Railway Express Agency, Inc., 926 Penn Avenue, Pittsburgh, Pa. Recommended by J. W. Johnson.

Nichols, Samuel A., Assistant Yard Master, Pennsylvania Railroad, 129 East Kennedy Avenue, N. S., Pittsburgh, Pa. Recommended by Harry W. Lehr.

Prichard, H. R., Assistant Chief Clerk, Donora Southern Railroad Company, Donora, Pa. Recommended by E. L. Roberts.

Quinn, W., Section Stockman, Stores Department, B. & O. R. R. Co., 2208 Lynnbrook Avenue, Brookline, Pittsburgh, Pa. Recommended by T. E. Britt.

Reynolds, A. C., Buyer, Aluminum Company of America, Gulf Building, Pittsburgh, Pa. Recommended by James Davies.

Rief, Joseph, O. S. & B. Clerk, B. & O. R. R. Co., 328 Mathews Avenue, Station 10, Pittsburgh, Pa. Recommended by T. E. Britt.

Schiller, Joseph, Jr., Rate Clerk, B. & O. R. R. Co., Grant & Water Streets, Pittsburgh, Pa. Recommended by T. E. Britt.

Schmidt, Fred C., General Yard Master, Donora Southern Railroad Company, 200 Modisette Avenue, Donora, Pa. Recommended by F. E. Van Woert.

Shepherd, W. B., Assistant General Traffic Manager, Aluminum Company of America, Gulf Building, Pittsburgh, Pa. Recommended by James Davies.

Sherlock, D. V., General Manager, Union Steel Casting Company, 62nd & Butler Streets, Pittsburgh, Pa. Recommended by R. H. Flinn.

Shields, J. C., Manager of Sales, Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa. Recommended by C. W. Trust.

Slater, A. H., Chief Clerk to General Superintendent, Pennsylvania Railroad Company, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Stayman, Ralph J., Manager of Sales, Steeel Construction Department, Jones & Laughlin Steeel Corporation, J. & L. Building, Pittsburgh, Pa. Recommended by Herbert J. Watt.

Volkert, Eugene L., Superintendent Transportation, Railway Express Agency, Inc., 333 Collins Avenue, Pittsburgh, Pa. Recommended by W. B. Moir.

PRESIDENT: I want to welcome the new members into the Club. I assure you we are glad to have you with us and hope you will receive as great benefit from your association here as we expect from your presence.

With the 38 new applications we have a total of 1,117 members, classified as follows:

CLASSIFICATION OF MEMBERSHIP:

Pennsylvania Railroad	281
P. & L. E. R. R. Co.	101
B. & O. R. R. Co.	71
Bessemer & Lake Erie Railroad Co.	30
P. & W. Va. Ry. Co.	30
Union Railroad Co.	27
Montour Railroad Co.	18
Donora Southern Railroad Co.	6
Monongahela Railway Co.	6
Monongahela Connecting Railroad Co.	5
Aliquippa & Southern Railroad Co.	3
Alton & Southern Railroad	2
Pittsburgh & Shawmut Railroad	2
Allegheny & South Side Railway	1
Chicago Great Western Railroad	1
Delaware & Hudson Railroad	1
Delaware, Lackawanna & Western Railroad	1
Detroit, Toledo & Ironton Railroad	1
Erie Railroad	1
Lake Terminal Railroad	1
Pittsburgh, Chartiers & Youghiogheny Railway	1
Pittsburgh, Lisbon & Western Railroad	1
Pittsburgh, Shawmut & Northern Railroad	1
Southern Pacific Lines	1
Union Pacific System	1
Unity Railways Company	1
Western Allegheny Railroad	1
Western Maryland Railway	1
Winfield Railroad	1
Railroads	598
Industrial and all others	519
Total membership	1,117

I have a brief report from the Chairman of the Advertising Committee to the effect that they have up to date secured $350 of new advertising, which is a 50% increase in the amount on the books at the annual meeting. If you will look over the last issue of the Proceedings you will see some nice new ads there. All of which indicates that we are getting some place with the Advertising Committee.

Mr. Secretary, have you any announcements?

SECRETARY: Since our last meeting we have received information of the death of following members: Harold L. Bruner, Chief Clerk Maintenance of Way, Pennsylvania Railroad, died February 16, 1935; James E. Campbell, Agent, P. & L. E. R. R. Co., died March 7, 1935; Joel S. Coffin, Chairman, Franklin Railway Supply Company, Inc., died March 11, 1935; V. W. DeLaney, Superintendent Transportation, Youngstown Sheet & Tube Company, died July 27, 1934; C. R. Rowley, Agent, Pennsylvania Railroad, died March 24, 1935.

Mr. Coffin was one of our charter members, having joined October 18, 1901. That was the first meeting of this organization. In November following those who had come in meantime were accepted as charter members, but he was one of the 49 who met and organized the Club on October 18, 1901.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings.

Now we have an unsual musical entertainment for you. After the very successful efforts of our Music Committee at the last meeting they asked a little relief from the pressure, so they are presenting to us tonight the Orpheus Choir, an organization having a very enviable reputation in musical circles in this part of the state, composed of forty mixed voices, who we are to hear through the courtesy of Mr. Brice Waxler of the Pennsylvania Railroad and Mr. Charles E. Planck of the Pennsylvania Airlines & Transport Company. I will ask Mr. Weis to introduce the Choir.

MR. F. E. WEIS: We are to have the pleasure of hearing the Orpheus Choir of Pittsburgh, one of Pittsburgh's leading musical organizations. I say that because I have heard them myself, and know they have taken a prominent place in musical circles in our city, having been entered in some of the more important contests, taking away first honors. They are under the direction of Mr. J. M. Ferguson, an enthusiastic exponent of Scotch music and I hope he will give us some of their Scotch numbers tonight. They have come here of course to entertain you primarily. There is another aspect however of which you should not lose sight. They are interested in radio work, and you gentlemen who are interested in programs for radio advertising will hear a presentation that would make a wonderful feature.

Now we are ready to hear from the Orpheus Choir.

PROGRAM

"Eriskay Lovelilt"	Choir
"Fleurs of the Forest"	Ladies' Ensemble
"The Old Woman"	Men's Ensemble
"McGreger's Gathering"	Choir
"My Curlie Headed Babbie"	Contralto Solo
Sarah M. Buchner	
"Down in a Flowery Vale"	Baritone Solo
J. M. Ferguson	
"Bold Turpin"	Baritone Solo
J. M. Ferguson	
"End of the Road"	Choir
"Wee Town Clerk"	Choir
"The Battle Hymn of Republic"	Choir

PRESIDENT: Mr. Ferguson, to you and to your splendid group of singers we want to express our thanks for this very wonderful entertainment. We would be glad to have you all remain, if you care to do so, as our guests for the rest of the evening.

I have several more applications for membership which I want to read. (These have been included in the printed list of applications.) If there is no further business to come before the meeting we will proceed at once to the address of the evening. Those of you who are wrapped up in the interests of the railroads can well appreciate the propriety of a paper on "Railroads and the National Welfare," and I do not know of any one we could have gotten to present this paper more eminently qualified to discuss this subject than the gentleman who will address you. It gives me a great deal of pleasure to present Mr. J. M. Fitzgerald, Vice Chairman, Committee on Public Relations of the Eastern Railroads, Eastern Presidents' Conference, New York City, who will address you on the subject, "Railroads and the National Welfare."

"RAILROADS AND THE NATIONAL WELFARE"

By MR. JOHN M. FITZGERALD, Vice-Chairman,
Committee on Public Relations of the Eastern Railroads,
Eastern Presidents' Conference, New York City

Mr. President and Gentlemen:

A visit to Pittsburgh is just like "old home week" to me, and I would be remiss indeed if I did not thank you for this privilege of renewing friendships of such long standing that I now hesitate to recall the span of their existence.

We hear much in these days regarding lack of initiative in the transportation industry and the failure of the railroads to make what we like to term "progress". It happens that you are holding this meeting upon a date which marks an important transportation anniversary—seventy-five years ago today the first pony express was established between Missouri and California. That this short period, a mere wag as time goes, has witnessed a development of the west which is unparalleled in history, must be conceded; that this great development was made possible by railroad transportation, cannot be denied.

As a people, we are again engaged in a nation-wide discussion of transportation service in this country, and discussion centers largely around our railroads. That is only natural. American railroads constitute the largest concentrated industry upon the face of the globe, and they represent about one-tenth of our national productive wealth.

That transportation is vested with a public interest, is freely conceded. Unfortunately, the public interest means different things to different people. Most any group can cite the public interest to support most any proposal which they seek to advance. Moreover, when we march upon government with demands for preferred treatment or special concessions which we think will give us an advantage over our competitors or an "edge" on our neighbor, we always use as our slogan the magic words—IN THE PUBLIC INTEREST.

When we approach a discussion of the railroads and the national welfare, we must consider not only the place of the railroad industry in the transportation field but we must likewise consider the place of the railroad industry in our national life.

From the viewpoint of national welfare, we meet the railroads as the greatest producers of mass transport known to the world. While we also lead the world in other forms of commercial transportation, it must be admitted that these other forms of transport are supplemental to railroad service—no other transport agency is today capable of handling at all times the maximum traffic demands of the people of this country.

In spite of the development of other forms of transportation, the railroads continue to provide about three-fourths of our inland transport service, and we are therefore dependent upon them for the distribution of the great bulk of our trade and commerce. Even in the depression year of 1934, American railroads loaded an average of 3,500 cars of freight and 51,000 persons boarded their passenger trains, every hour of every day of the year; and that is quite some volume of traffic for an industry which is sometimes accused of having one foot in the grave.

We also find the railroads making another important contribution to national welfare; they are the largest employers of labor, and even some of my railroad friends may be surprised to learn that in the fifteen year period since 1920, the railways have disbursed more than 38 billion dollars in wages. Even in the depression year of 1934 their wage disbursements averaged more than 173 thousand dollars for every hour of the day, every day of the year.

In addition, the railways are the largest consumers of the products of other industries. During the past ten year period the rail carriers have spent more than 10 billion dollars for fuel, materials and supplies and this does not include a single dollar expended for capital projects. But, of greater interest to the Pittsburgh district is the fact that more than 6 billion dollars of this expenditure went for products of iron and steel and for fuel. Of course, we know that railroads are the largest consumers of what we term durable goods; that is why the Public Works Administration was anxious to have the railroads borrow 200 million dollars for purchase of equipment, rails and other products of durable goods industries; and these purchases of durable goods spread to forty states in the Union.

A few weeks ago the Pennsylvania Railroad completed the electrification of its line between New York and Washington; it was formally opened with a test run of a train from Washington to Baltimore and return and which attained high speed with safety. This demonstration of speed immediately captured popular imagination throughout the land. But the real important feature of the final link in this electrification work, is the fact that it provided full time employment for twenty-five thousand men for a period of twelve months.

A few months ago a study was made of twenty-six railroads operating about 40 per cent of Class I railway mileage in this country, covering the purchases of fuel, materials and supplies for the year 1933. During that year, these twenty-six railroads purchased from more than 7,800 different industries located in nearly 1,700 cities scattered throughout every state in the Union, and included purchases from 333 different industries in 95 cities in the state of Pennsylvania.

Nor should we forget the contribution of the railroads to the support of government—here we find the rail carriers as our largest corporate taxpayer. Or we may properly say that government has made the railways its largest tax collector. I sometimes think that rail taxes have increased by leaps and bounds over the past twenty-five years, due largely to the fact that these taxes are easy to collect, they come in large sums, and they do not cause a "squawk"—people never seem to realize that out of every dollar paid to railroads for freight and passenger service, eight cents goes to government. Of course, eight cents does not mean much in these days of millions and billions but—it adds up. Of the money which the public has paid for railway service over the fifteen year period since 1920, nearly five billion dollars has been returned to the people in the form of taxes to federal, state and local governments. Moreover, in normal years the railroads provide nearly three million dollars weekly in taxes for the support of the public schools, and more than three million dollars weekly for other governmental purposes.

The railroad industry also carries a public interest from the standpoint of investment. It is probably fair to say that in the years which have passed, we have not been unusually generous in our treatment of the investor in railroad securities. In fact, the investor was scarcely considered a part of the public interest until the Transportation Act of 1920 promised the railroads an opportunity to earn a fair return upon the investment in the enterprise—if they could earn it.

Today, we tell the investor that we are sorry for him but that he is just out of luck in having invested in an industry which is over capitalized. As a matter of fact, the railroad industry is not over capitalized even on the basis of the lowest valuation for the railroads ever submitted by any qualified authority. Of course, there are some railroads which probably need a readjustment of their financial structure. But that is true of all other lines of business, and like other business, some of the financial difficulties are the result of a long and tragic period of depression.

It is unfortunate that the people are sometimes led to think of railway ownership in terms of a few rich men or a few banking institutions. We lose sight of the fact that savings banks and insurance companies are large holders of railway securities, in which more than half of our population has a vital stake. Moreover, during the depression we discovered that some two million men and women in this country hold moderate amounts of railway securities, and failure of the carriers to continue payment of interest and dividends resulted in great hardship to these good citizens.

It must be apparent that the railways always play an important part in sound and lasting prosperity and it is therefore only natural that everybody should ask—what is the matter with the railroads? The answer is simple, they are suffering from a business depression which has effected all other industry and practically every individual. Since 1920, rail traffic volume has declined fifty per cent. What the railways need is what all other business needs—more business.

However, it is true that the railway situation has been aggravated through failure to provide a national transportation policy which would deal fairly with the rail carriers, and which would give them an equal opportunity to seek traffic in fair competition with other transport agencies.

The Emergency Transportation Act of 1933 created the post of Federal Coordinator of Transportation, and Joseph B. Eastman, member of the Interstate Commerce Commission, was appointed to this office. Along with other duties, the Coordinator was instructed to make a study of the transportation situation in this country and submit conclusions, as well as recommendations, for legislation necessary to a sound national transportation policy directed to the orderly use of all transport facilities in this country.

Mr. Eastman has included in his legislative program two bills which are now before Congress; they provide for a fair and proper measure of regulation for motor and water transport, to be administered by the Interstate Commerce Commission which now regulates the railways. The rail carriers endorse these bills in principle and they would like to see them enacted.

But, there is other legislation in Washington which should have the thoughtful consideration of those who pay for transportation service in this country. The legislative program of the railway labor executives includes proposals for a six-hour day without any reduction in present wages; a full crew law; a train limit law; a modification of the hours of service limits; and government track and signal inspection. Bills covering these proposals are now before Congress and they have the support of the railway labor organizations. Time would not permit a discussion of the merits of these bills on this occasion. However, I desire to direct your attention to the fact that if these bills are enacted into law they will add more than one billion dollars annually to the cost of operating the railways. Do you think that the trade and commerce of this country will stand rate increases necessary to support increased operating expenses in this huge amount.

I am sure that we agree that labor in all industry is always entitled to the highest permissible wage and the best possible working conditions. But wage payments of any industry must necessarily have a sound relationship to the income of that industry. Moreover, we should remember that with the restoration of the balance of the ten per cent temporary wage deduction which becomes effective April first, the basic wage rates of railway labor will soar to the highest point in railroad history—even higher than the peak year of 1929.

Of course railway workers have suffered as a result of the business depression. Some men have been furloughed and others have worked only part time. But that is likewise true of all other business, and it is always true in periods of depression. Furthermore, I think we must face the fact that the prosperity of workers is dependent upon the prosperity of the entire country—the interests are mutual and they cannot be separated. I think we may also agree that only a prosperous industry can confer a maximum of benefit upon its workers. The railroad industry has not been prosperous and it is not prosperous today. Before it is asked to share prosperity it must first have some prosperity to share.

As I see it, the public interest in transportation revolves around two fundamentals. First, I think we must have a balanced transportation situation from the standpoint of our investment in transport facilities. In other words, our total investment in transportation of all sorts and kinds, including investment which government itself makes in transportation, should bear a proper relationship to our total investment in all other goods and services in this country. The transportation investment should be sufficient to provide adequate and satisfactory service, but it must not exceed a sum which our investment in other goods and service can fairly and proprely support. Moreover, the investment in the various forms of transportation must bear a proper relationship, based upon our need for them, in order that we may not find ourselves with too much of one service and not enough of other forms of service.

Second, we should always have a progressive development of transportation. I do not mean a progressive development of transport facilities regardless of cost and regardless of the need for them. I do mean a progressive development in the art of transportation, to the end that we may always be abreast of the times and that all forms of transport shall be in a position to adopt the most modern methods, and aim constantly to a higher standard of service and at decreasing costs—when possible.

Legislation directed to the creation of a national transportation policy should consider these fundamentals of transportation economics. Aggressive selfishness and political expediency should be discarded. We should hew to the line of the sound business principles which have been applied successfully to other industrial enterprises in this country. I thank you.

PRESIDENT: After listening to that very splendid address I can not see where there is room for very much difference from the opinion expressed by the speaker. Nevertheless I will have to ask if there is any discussion. I have not arranged prior to this meeting to have any one get up and say anything, but if any one has any question to ask or wants to bring up any discussion, now is the time to do it.

If there is no discussion, I am going to refer to our own musical organization for a moment, because I noticed they were looking on this Orpheus Choir with a great deal of interest. I believe they ought to be given an opportunity to demonstrate that they are still with us and I am going to ask them if they will not come forward and render "Working on the Railroad."

(The music was duly rendered and well received.)

If there is no further business I will call upon Mr. J. G. Code, who is our oldest living past President, to close the meeting.

MR. J. G. CODE: Quite some years ago, anticipating the present political and economic situation, The Railway Club of Pittsburgh adopted a Code and still has it. One principle of that Code has been that when a man does a good job it should be recognized and due appreciation shown. Therefore I would move you, Mr. President, that the club extend a rising vote of thanks to the speaker of the evening as an expression of our appreciation of his splendid address.

The motion was duly seconded and prevailed by unanimous vote.

PRESIDENT: It certainly looks like the motion was carried. Mr. Fitzgerald, I extend to you the thanks of the Club.

If there is no further business, we will adjourn to the tables, which you will find prepared in both ends of the room.

J. D. CONWAY, Secretary.

In Memoriam

HAROLD L. BRUNER
Joined Club November 22, 1934
Died February 16, 1935

JAMES E. CAMPBELL
Joined Club March 25, 1925
Died March 7, 1935

JOEL S. COFFIN
Joined Club October 18, 1901
Died March 11, 1935

V. W. DE LANEY
Joined Club December 22, 1911
Died July 27, 1934

C. R. ROWLEY
Joined Club November 22, 1934
Died March 24, 1935

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OFFICIAL PROCEEDINGS
RAILWAY CLUB OF PITTSBURGH
$1.00 Per Year 25¢ Per Copy

Vol. XXXIV. APRIL 25, 1935. No. 6.

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By W. S. BROTZMAN, Associate Meteorologist,
United States Weather Bureau, Pittsburgh, Pa.

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OFFICIAL PROCEEDINGS
OF
The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 6

Pittsburgh, Pa., April 25, 1935

$1.00 Per Year
25c Per Copy

INDEX—ADVERTISERS.

The Railway Club of Pittsburgh:

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Name...

Title...

Company...

My Address...

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Recommended by...

NOTE—This form to be filled out in full by typewriter or printed and mailed to J. D. Conway, Secretary, 1941 Oliver Building, Pittsburgh, Pa. Membership fee, including dues, is $3.00 for each fiscal year or part thereof, except those propesd in September or October. Those proposed in these months will be credited upon payment for the following fiscal year. Dues are payable in advance.

The fiscal year ends with the month of October.

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Vol. XXXIV No. 6 | Pittsburgh, Pa., April 25, 1935 | $1.00 Per Year 25c Per Copy

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C. C. CLARK, Sales Manager, Pressed Steel Car Company, McKees Rocks, Pa.

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P. W. HEPBURN, Sales Engineer, Gulf Refining Company, Pittsburgh, Pa.
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C. W. TRUST, Assistant Traffic Manager, Carnegie Steel Company, Pittsburgh, Pa.
CHARLES M. WHEELER, Sales Engineer, Union Switch & Signal Co., Swissvale, Pa.

PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

APRIL 25, 1935

The meeting was called to order at the Fort Pitt Hotel at eight o'clock, P. M., with President R. H. Flinn in the chair.

Registered attendance, 274, as follows:

MEMBERS

Adams, Charles E.
Adams, F. W.
Allison, John
Ambrose, W. F.
Anderson, H. N.
Ament, F. Chalmer
Arnold, J. J.
Babcock, F. H.
Baker, W. E.
Balzer, C. E.
Barclay, J. R.
Baumann, E. G.
Beam, E. J.
Beatty, Raymond N.
Beltz, J. D.
Bergman, Carl R.
Bishop, M. L.
Britt, T. E.
Buchanan, C. C.
Buck, E. R.
Buffington, W. P.
Burel, W. C.
Burk, G. C.
Burnette, G. H.
Buzzerd, J. P.
Carlson, H. E.
Carlson, L. E.
Carr, T. W.
Carroll, D. C.
Case, H. D.
Chaffin, H. B.
Chilcoat, H. E.
Christner, L.
Christy, F. X.
Christy, G. J.
Clardy, W. J.
Clark, H. C.
Clements, Frank C.
Clowes, W. K.
Coombe, A. B.
Conway, J. D.
Cook, S. J.
Courtney, Harry
Crawford, D. F.
Cruikshank, J. C.
Dalrymple, R. W.
Dambach, C. O.
Davis, Charles S.
Dawson, V. N.
Dean, E. E.
Dean, W. H.
Dihle, James E.
Dehne, G. C.
Dierker, R. H.
Durell, W. A.
Edmonston, George F.
Egly, M. J.
Emery, E.
Endsley, Prof. Louis E.
Escott, Charles M.
Evans, C. S.
Falkner, A. J.
Farlow, G. B.
Ferguson, R. G.
Fischer, John G.
Finegan, T. A.
Flinn, R. H.
Foard, E. A.
Folan, J. V.
Forsberg, R. P.
Forsythe, George B.
Fox, M. C.
Frauenheim, A. M.
Frauenheim, Pierce
Freshwater, F. H.
Frushour, H. T.
Furch, George J.
Gandy, Ralph H.
Gatfield, Phillip
Gellatly, William R.
Gilbert, William J.
Gilg, Henry F.
Gillespie, J. Porter
Glenn, J. H.

Goda, P. H.
Goldcamp, C. F.
Goldstrom, G. E.
Groves, Walter C.
Grunden, B. C.
Hackett, C. M.
Haggerty, J. F.
Haller, Nelson M.
Hansen, William C.
Harper, G. C.
Harper, J. T.
Hawkes, T. L.
Hayward, Carlton
Heed, H. L.
Heimbach, A. E.
Hemma, Charles H.
Henning, C. C.
Higgins, George A.
Hilstrom, A. V.
Hofmann, E. L.
Holland, S. E.
Holmes, E. H.
Hoopes, R. E.
Huber, H. G.
Irwin, R. D.
Johnson, J. W.
Kane, H. S.
Keck, L. M.
Keeney, A. R.
Kentlein, John
Kessler, A. L.
Kiskadden, H. L.
Koch, C. W.
Kramer, W. H.
Kraus, Raymond E.
Kruse, J. F. W.
Lanahan, Frank J.
Lanahan, J. S.
Larson, W. E.
Leban, J. L.
Lee, L. A.
Lehr, H. W.
Loder, C. C.
Longdon, Clyde V.
Loucks, W. V.
Machin, N. H.
Maliphant, C. W.
Marble, A. E.
Megee, C. R.
Merz, G. L.
Millar, C. W.
Miller, John
Miller, R. C.
Mills, O. B.
Misner, George W.
Mitchell, W. S.
Moir, W. B.
Montague, C. F.
Morgan, A. L.
Morgan, Homer C.
Murray, C. C.
Myers, Robert H.
McCracken, C. M.
McCrea, J. G.
McHail, J. L.
McKenzie, Edward F.
McKinley, A. J.
McKinley, John T.
McLaughlin, H. B.
McNamee, William
McNary, Frank R.
McQuiston, C. A.
McTighe, B. J.
Nichols, Samuel A.
Norris, J. L.
O'Leary, J. J.
Osborne, Raymond S.
O'Sullivan, J. J.
Prichard, H. R.
Purchard, Paul
Provost, S. W.
Queer, Thomas H.
Rebstock, J. B.
Reed, E. S.
Reed, M. R.
Rief, Joseph
Roberts, E. L.
Rose, A. J.
Rutter, H. E.
Ryan, J. M.
Satterfield, A. T.
Schmitt, Andrew
Seltman, O. W.
Schiller, Joseph, Jr.
Schmidt, F. C.
Schako, E. J.
Schrecongost, C. P.
Schultz, D. C.
Schaffer, G. F.
Sheridan, T. F.
Shingledecker, J. C
Shuster, W. W.
Simons, Philip
Simpkins, Fred E.

Sixsmith, G. M.
Slater, A. H.
Smith, G. M.
Spencer, A. C.
Stewart, C. D.
Sullivan, P. W.
Stevenson, H. G.
Stucki, A.
Sutherland, L.
Swope, B. M.
Sykes, A. H.
Ternent, H. J.
Teufel, W. O.
Tracey, J. B. A.
Trautman, H. J.
Thomas, George P.
Thornton, A. W.
Triem, W. R.
Troxell, H. K.
Vollmer, Karl L.
Van Nort, C. W.
Warfel, John A.
Weaver, W. Frank
Weis, F. E.
West, George S.
Wheeler, C. M.
Whitehouse, E. L.
Wildin, G. W.
Williams, O. J.
Wilson, James R.
Wilson, W. S.
Woodward, R.
Wright, J. B.
Yarnall, Jesse

VISITORS

Ayres, N. C.
Barnum, H. M.
Breneman, Richard R.
Brotzman, W. S.
Bruce, B. L.
Byham, D. E.
Cavian, Henry C.
Chamberlin, R. W.
Clark, E. C.
Crittenden, P. L.
Davis, William B.
Dunham, C. W.
Dunham, Paul
Ebersberger, Frank
Eichner, John
Fails, G. A.
Forster, W.
Gatfield, William
Geiser, W. P.
Goodwin, A. E.
Gray, C. C.
Hassler, E. S.
Hahn, H. A.
Hofmann, R., Jr.
Jones, J. D.
Keene, Jack
Kroen, Vincent
Lewis, S. B.
Lumpp, R. J.
MacElveny, A. W.
Marshall, L. L.
Michaels, J. Hunter
Mitchell, F. K.
McCandless, Joseph M.
McGregor, Daniel C.
Painter, William
Parse, H. C.
Reynolds, D. E.
Robinson, H. J.
Smith, Sion B.
Snitehurst, J. H.
Spratley, Charles J.
Terkelsen, B.
Turner, W. M.
Van Wormer, George M.
Vingant, M. H.
Vogelsang, Hans
Vollmer, Paul F.
Wagner, George F.
Walter, W. A.
Wiesmann, T.
Weis, Mrs. F. E.

The roll call was dispensed with as every one had signed the registry cards at the door.

There being no objection, the reading of the minutes of the last meeting was dispensed with as the printed Proceedings reached the members yesterday.

President Flinn announced the following list of additions to the membership roll, asking, as is the custom, that those present stand when their names are called, that the members may become acquainted with them.

Beatty, Raymond N., Conductor, Pennsylvania Railroad, 710 East Bell Avenue, Altoona, Pa. Recommended by Harry W. Lehr.

Bergman, Carl R., Supervisor Track, Pennsylvania Railroad, 229 First Street, Aspinwall, Pa. Recommended by Harry W. Lehr.

Carver, Alex. B., Salesman, U. S. Chromium Company, Glasgow Road, Forest Hills, Pittsburgh, Pa. Recommended by J. D. Conway.

Clark, R. A., Mellon-Stuart Company, Oliver Building, Pittsburgh, Pa. Recommended by R. P. Forsberg.

Galinis, J. W., Draftsman, Pennsylvania Railroad, 709 East McKeesport, Pa. Recommended by Harry W. Lehr.

Kiskadden, H. L., Clerk, Pennsylvania Railroad, 115 Stewart Avenue, Freeport, Pa. Recommended by G. M. Sixsmith.

Paul, William C., Assistant Plant Manager, American Chain Company, Inc., First Street and P. & L. E. R. R., Braddock, Pa. Recommended by J. D. Conway.

Rankin, R. E., Manager, Pittsburgh Repair and Supply Department, Goodman Manufacturing Company, 1011 California Avenue, Avalon, Pittsburgh, Pa. Recommended by H. G. Stevenson.

Turner, C. B., Vice President, South Penn Oil Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by T. E. Atkins.

Wiggins, W. D., Chief Engineer, Central Region, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by R. P. Forsberg.

PRESIDENT: Are there any announcements, Mr. Secretary?

SECRETARY: Since our last meeting we have received information of the death of one of our members, Daniel J. Whalen, General Manager, The Canton Car Company, Canton, Ohio, died April 17, 1935.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings.

Is there any further business to come before the meeting at this time? If not, I want to announce that our usual program has been slightly altered tonight. Our Musical Committee has something worked out, but they are not quite ready to present it, so we will have the musical program at the end of the meeting, after the paper, instead of at the opening as we usually do.

We are to have tonight a paper which I think is not only highly appropriate at this time, but it ought to be particularly interesting to railroad men. I do not know of anything we watch any closer on the railroads than the state of the weather and the sort of weather we are going to get over the ensuing twenty-four hours. We are always in close touch with the Weather Bureau. In addition to the daily weather reports which always reach our desks, we frequently during periods of severe weather call up on the 'phone and get detailed information in addition to the customary weather reports and forecasts.

It is a distinct privilege and a great pleasure tonight to have with us Mr. W. S. Brotzman, Associate Meteorologist of the United States Weather Bureau located in Pittsburgh. You know when men meet they are very apt to say it is a fine day or nice weather, and sometimes when these remarks are made the weather is really not so good. Indeed many times we do not think so much of the weather we are handed out in Pittsburgh. I am going to give Mr. Brotzman a chance to defend himself and make explanation. It is a pleasure and a privilege to introduce to the Railway Club of Pittsburgh Mr. Brotzman.

OBSERVING THE WEATHER

By W. S. BROTZMAN, Associate Meteorologist, United States Weather Bureau, Pittsburgh, Pa.

It is a great privilege to be permitted to address the membership of a Club of this character. It is not always easy to bring clearly to the minds of people in general just what the Weather Bureau is doing, without some means of illustration. So, I have prepared slides, which will give you an idea of how weather observations are made, and the information gained thereby is disseminated. It is desired to make this talk as informal as possible. Therefore, if at any time, as we go along, there is anything you would like to have explained more fully, I hope you will feel free to ask questions.

I show you first the proverbial Weather Prophet. The old farmer, who tells you what the weather is going to be from various signs, that he has observed in his long experience out of doors. I do not wish to ridicule nor discredit this type of forecasting, for it is possible to forecast the weather in this way for short periods of eight or ten hours in advance. Some men, who spend a great deal of time out of doors, such as farmers, sailors, ranchmen, etc., often can tell the coming weather by the appearance of the sky, the direction of the wind, the kind of clouds, sounds, and by the way the air feels.

In speaking of the atmosphere, one of the first questions that arises is concerning its composition. This graph shows not only the names of the gases that compose the atmosphere, but, also, the distribution of the gases. The most commonly known gases are Oxygen, Nitrogen and Hydrogen, and we might include the vapor of water. In addition to these we have Argon, Carbondioxide, Helium, and others. Nitrogen, you will notice, extends from the surface of the ground up to about 80 kilometers. The amount of oxygen is much less than nitrogen, and extends from the ground, in a rather constant amount, up to about 20 kilometers, where it begins to diminish very rapidly. Hydrogen occupies the upper atmosphere mostly, the amount at the surface of the ground being a mere trace as compared with oxygen and nitrogen. Argon, vapor of water, and carbon-dioxide are small in amount as compared with oxygen and nitrogen, and are found only in the lower air.

About one-half of the atmosphere lies below the 5 kilometer, or 3 mile level, and most of the storms operate below this level. Above 11 kilometers, or 7 miles, we have a region of constant temperature, of about 55 degrees Centigrade, or 67 degrees Fahrenheit. This belt is known as the stratosphere.

This drawing shows the distribution of air pressure in terms of the temperature at which water boils. At sea level the barometric pressure is about 30.00 inches, and water boils at 212 degrees. At a height of 3 miles, water boils at 184 degrees, and the pressure is reduced to about 15.00 inches. At 7 miles water boils at 159 degrees. Aviators have gone nearly to that height, and balloonists have gone several miles above it, where water boils at 135 degrees.

We show here a list of the six principal weather elements; temperature, pressure, wind, humidity, clouds, and precipitation. If we know the value of these six elements, at any given place, we will have a fairly good idea of the weather at that place. We gain information as to the weather elements largely by instruments, most of which are self-recording. First, we show you the sunshine recorder. It is used for recording the duration of sunshine. In other words it shows the number of minutes the sun was shining during the day, and the exact time the sun was shining. When the sun goes behind a cloud, or when it goes down in the evening, the mercury in the instrument drops and breaks the electric circuit, which stops the recording in the office.

Here we have a minimum and a maximum thermometer. The one shows the lowest temperature since the last observation, the other the highest. These thermometers are always mounted in a horizontal position, as you see in the photo. After the readings have been taken, at observation times, the instruments must be set to the current temperature.

The thermograph, shown here, gives a continuous record of the temperature by means of a thermostat, and a pen on a revolving cylinder.

There are two types of barometers; the mercurial and the aneroid. In the one the barometric pressure is indicated by the height of the column of mercury in the tube, while in the other the pressure is indicated by a pointer moving over a scale graduated in divisions representing inches in the length of the column of mercury in the mercurial barometer. The barograph is a recording barometer of the aneroid type, which gives a continuous record of the changes of barometric pressure.

We now come to the wind instruments; the anemometer, which you see here, is used to measure the wind velocity. The instrument is mounted on the roof, usually, where it receives the unobstructed air currents, and is connected by wire to a register in the office. It records the wind movement in miles per hour. The wind vane is usually mounted on the same support with the anemometer, and records the direction of the wind electrically on a register in the office.

We have here a recording rain gage, for making a record of the amount and intensity of rainfall. This is a 12-inch gage, and is essentially a funnel, mounted over a tipping bucket. The tipping bucket is so constructed and balanced, that the weight of one one-hundredth of an inch of rainfall will tip it over, and as it tips it makes electrical contact and records in the office. The accumulation of water in the gage is drawn into a measuring tube at the regular observations, and is measured with the measuring-stick shown on the left. The stick measurement is the official measurement.

Another type of gage, which you see in this picture, is not a recording gage. It is an eight-inch funnel, or catch basin, mounted over a measuring tube. The size of the measuring tube is one-tenth the size of the catch-basin, thus making it possible to measure small amounts of rainfall with a considerable degree of accuracy.

This, rather complicated looking machine, is called a triple register. It records duration of sunshine, rainfall, wind direction and wind velocity. The sheet on the cylinder is changed every day at noon, and it contains the record for the preceding 24 hour period. This instrument is installed in the office of the Weather Bureau, and it is connected by wire to the several instruments described, which are usually installed on the roof of the building.

This is a photograph of a psychrometer. It is used to determine the dew point temperature, the relative humidity, and the vapor pressure. The two thermometers are alike, except that on the one called the wet bulb a piece of muslin covers the bulb. To take a reading the muslin is first saturated with water, then the thermometers are whirled, with this whirling apparatus, to assist evaporation. If the air is saturated with moisture as might be expected during a dense fog or during a heavy rain, there will be no evaporation from the wet bulb, and the humidity is then said to be 100 per cent. If, on the other hand, the air is very dry there will be rapid evaporation from the wet muslin on the bulb, which will have a cooling effect on the thermometer, and the mercury will drop. The difference between the readings of the two thermometers, with the dry bulb temperature, is used for calculating the dew point temperature, the humidity, and the vapor pressure. Humidity is always expressed in percentage of saturation. Saturation being 100 per cent.

The thermometers and thermograph are housed in a shelter of the type you see here. The shelter is so constructed that the air readily flows through the sides and bottom, and the roof is double with an air space between to prevent radiation from the heat of the sun from the roof. Thermometer readings are always made in the shade.

Weather observations are made twice each day, at 8 a. m. and at 8 p. m. These observations are distributed to nearly all the Weather Bureau offices by telegraph, and in order to save time and expense of telegraphing, the reports are sent in code. We have here a sheet of coded weather reports. As soon as these reports are received at the Weather Bureau offices they are decoded, and the values of the several elements telegraphed are entered on a chart, called Map A. As you can see, it is a map of the United States, showing the outlines of the states, and the circles represent Weather Bureau stations. Reports from 100 Weather Bureau stations are received at Pittsburgh. The data entered on this map A are: temperature, pressure, wind, rainfall, direction and velocity of wind, and the degree of cloudiness. After the data have been entered blue lines are drawn through places of equal temperature, and red lines through places of equal pressure. The temperature lines usually begin with a relatively high number at the south, and there is a gradual decrease. The pressure lines round up sections of high and low pressure. Arrows show the direction of the wind, and the degree of cloudiness is shown by shading the circles.

Notice on the chart how the arrows which represent wind direction point around the center of the low pressure anti-clockwise, and in towards the center. Also, note the opposite wind movement in the high pressure areas. The low pressure areas are usually spoken of as storm centers. They are nearly always accompanied by cloudiness, precipitation, (either rain or snow) and, as a rule, relatively mild temperature. Highs, on the other hand, are accompanied by fair weather and relatively cold. The forecaster depends largely on the character, and the movements of these highs and lows for making his forecasts.

And, now, turning back to our map-making story; after map A is completed all the lines and characters are transferred to a smaller chart, and then to a chalk plate. The chalk plate is a steel plate coated with chalk, about 1/16 inch thick. The shaded areas you see in the chalk plate indicate where precipitation occurred in the last 24 hours. After the chalk plate is completed it is put into a casting box, which is then filled with molten type metal. The cast thus made, which you see on the right, has a printing face of the weather map, which is now ready to print over the base maps of the United States, shown in this picture beside the printed map. Usually about one and one-half hours after all the coded weather reports are in, or about 10:30 a. m., the printed maps are ready for distribution.

By comparison of these maps we can follow the movement of storms across the country. In the case we have before us there was a storm center over southern Utah. It had produced only a small amount of precipitation at rather scattered places. By the next morning the storm had moved to eastern Colorado and western Kansas, and rain or snow had spread over practically all of the northern half of the country as is shown by the shading. Notice how the arrows are pointing anti-clockwise around the center, and in towards the center. Notice, also, the north-southward trend of the pressure lines, which usually is a good indication of a sharp drop in temperature, following the storm, especially during the winter months. The third day the storm had advanced to the Lake Region, and, as the shaded area shows, precipitation occurred over most of the country as a result of this storm. The vast high pressure following the storm is attended by fair weather and low temperature. The zero line dips far down into Kansas, and over the more northerly Plains the temperature is 10 degrees below zero.

This series of winter maps shows the distribution of temperature about a low pressure area. Notice the relatively high temperature on the southern and eastern sides, and the low temperature on the north and west. The high pressure in this map shows the low temperature in the front and the relatively high temperature on the western side, where the wind directions you will notice are from the south.

There is another type of storm we hear a great deal about, during the summer and fall months, known as the tropical storms, or hurricanes. They usually develop off the western coast of Africa, travel westward across the Atlantic, increasing in intensity as they progress westward, frequently becoming violent and destructive in character, due to high wind and heavy rainfall, by the time they reach the West Indies or the mainland. These slides show the daily travel of several such storms, and the paths they usually follow as they near our eastern coast. The tropical storm of 1900, that did so much damage at Galveston, Texas, moved northward over the western tip of Cuba to the west Florida Coast, thence westward over the Gulf to Galveston. See the approach to the new causeway at Galveston after a hurricane had done its work.

The barometer exhibits a very striking behavior when such a storm is passing over. We have here the barograph chart made at Miami, Florida, in September, 1926. Notice how it dropped rapidly to 27.61 inches from nearly 30.00 inches, then 40 minutes later the pressure increased at nearly the same rate as it had decreased shortly before. By the time the storm reached Mobile, it had diminished in intensity to the extent that about five hours were required for the storm center to pass over, and the lowest pressure was only 28.80 inches.

During the hurricane season, when this type of storm develops, pressure is relatively high over the middle Atlantic Ocean and over the interior of the United States.

Let us now turn our attention to another type of storm which is quite common over this section, and which all of you have experienced: the thunderstorm. We show here a drawing, depicting the development of the cumulus cloud. The further developments of this type of cloud forms what is usually spoken of as a thunder-head. When you see this type of cloud, which is common during the summer months, you can picture the air movement under the cloud as the drawing shows. At the level of the flat base, the temperature is at the dew point, or sufficiently low to condense the invisible vapor in the air. The vapor then becomes visible, and piles up to form the dome-shaped mass you see. This slide shows the ascending and descending currents over an area, when a number of clumps of cumulus clouds are visible. It is a condition the aviator calls "bumpy". In the early days of aviation these downward currents were thought to be air pockets, and many accidents occurred as a result of these so-called pockets.

When this process of cloud formation is of sufficient intensity and duration, a tremendous mass of cloud material is piled up, and the high tops of the clouds become the thunderheads. The rush of the warm moist air up into the cloud is called the feeder of the thunder cloud, and the thunderstorm will continue until something happens to break up the feeder currents.

In this picture we have an actual photograph of a thunderstorm in progress. Notice the shape of the cloud; how nearly it conforms to the drawings in the preceding pictures. In the center is shown the heavy downpour of rain. The tops of such thunder clouds may be from one to two miles high, and snow, sleet, and hail is usually found in the upper portions. Hail stones sometimes grow to extremely large dimensions. The hail shown here was picked up in Potter, Nebraska, July 6, 1928. The largest of the group measured 17 inches in circumference. The damage resulting from hailstorms runs into millions of dollars, each year, in the United States alone. Corn fields and cotton fields are frequently devastated by hail as the pictures show. This photo of the Allegheny Conservatory shows most of the glass in the roof and sides broken by hail stones, that measured as much as 2 inches in diameter, on May 20, 1893. The lightning that always accompanies thunderstorms, also, is a tremendous factor in causing the damage resulting from such storms. This bur oak tree, as the slide shows, was literally shredded by a stroke of lightning. Damage, such as this, gives us some idea of the stupendous electric voltage discharged in a single stroke of lightning.

The most violent and destructive type of storms is the tornado. Tornadoes are most frequent during the warmer seasons of the year, and they are rather partial to the central portion of our country; although, they are not entirely unknown in nearly every state in the Union. The following series of actual photographs, taken shortly after the passing of the storms, shows clearly the dangers that attend these much dreaded storms. The photograph of the funnel cloud was taken in Kansas. The observer was quite near the path of the tornado. The top of the picture was taken first and the lower portion immediately after.

Deep snows and severe blizzards occur in some parts of our country every year. They are the cause of much damage to many industries, and especially to railroading. Note the snow piled up at a town in South Dakota, and in the next picture a Baltimore and Ohio engine completely overwhelmed by snow in a cut on the B. & O. Lines.

Ice freezing on all exposed objects, called glaze, as we see here, is especially damaging to trees, electric lines, etc., to say nothing of the hazard to motorists. The ice on the wires shown here is 3 inches thick, and the weight between the poles on a single wire was estimated to be 800 pounds.

It is not easy to visualize the meaning of an inch of rain. It means that the ground would be covered to a depth of one inch if it all remained where it fell. On an acre it would weigh 113 tons. On a square mile 72,320 tons. On the Allegheny River Basin 837,465,600 tons. Is there any wonder that the rivers rise rapidly after a fall of as much as an inch of rain.

Extremes of weather have been calculated, and the locations of some of these extremes may be seen in this picture. In the southern part of Florida is the wettest place in summer. In Northwestern Florida, the most thunderstorms are experienced. Fogs of longest duration occur along the North Atlantic Coast. Over the Great Lakes is the windiest weather. The most tornadoes occur over the Southern Plain States and the Lower Mississippi Valley. The most rapid changes in temperature occur along the eastern slope of the Rocky Mountains in Montana and over into the Dakotas; here the temperature frequently changes as much as 30 degrees in a few hours. The lowest temperature ever recorded in the United States is 63 degress below zero at Poplar River, Montana; and the highest is 134 degrees at Greenland Ranch, Death Valley, California. The most equable climate is in Southern California. The greatest annual rainfall is in Oregon, where the average annual amount is 130 inches. The driest place is in Death Valley, at Greenland Ranch, where a seven-year average shows the annual amount to be 1.65 inches.

This is the last slide.

If there are any questions, I will be glad to try to answer them.

PRESIDENT: I have not arranged with any one to give a prepared discussion, so I will ask any of you who have anything to say to get up on your feet and say it.

MR. HENRY F. GILG: Some years ago, I had occasion to make a business trip of four months to Nova Scotia. There was no snow in January, but began snowing on February 2, and it snowed every day for seven weeks, the precipitation being about twelve feet. What struck me as odd was that the temperature ranged most of the time from 10 to 16 degrees below zero.

While in the car of the Superintendent of the Halifax & Southwestern Railway, at the end of April, he told me he had been on the Quebec Central Railway some years before, and at a conference regarding the extension of the track 200 miles farther North, one of the members said the snow would be too deep. Another man said there was less snow 200 miles above the terminus than there was at Quebec.

What I should like to know whether there is an isotherm for the Northern limit of snow fall, the maximum and minimum temperatures in our own district at which we have falls of snow. Also, in Nova Scotia the temperatures ranged from 10 to 20 and 26 degrees below zero for three days, and there were snow squalls of 10 to 20 minutes duration, then a clear sky for an equal length of time. Is it likely that the snow was formed over the Gulf Stream and blown over the peninsula?

MR. BROTZMAN: I am not sure that I can remember all your questions, but I will do the best I can and you may repeat those that I fail to cover. There is a prevailing idea that at times it is too cold to snow. That may be true at Pittsburgh, although it snows at Pittsburgh with quite low temperatures. Our snow storms usually accompany the centers of low pressure, and the lows are seldom attended by low temperatures in this section. Our low temperatures accompany high pressure, and the highs, as we have seen on the charts, are usually accompanied by fair weather. At points as far north as Nova Scotia, the temperature frequently is quite low, even in relatively low pressure while a snow storm is in progress. Yes, it is quite possible that a snow storm produced heavy snowfall at Nova Scotia, and only light snow at points farther north. Nova Scotia may have been near the center of the path of the snow storm, while the point you mention farther north may have been outside of the path of the storm. In Greenland it never rains. All precipitation is in the form of snow, and at times snow falls at very low temperature.

In this latitude snow sometimes falls at temperatures a few degrees above freezing, and our heaviest snows occur when the temperature is at or not far below the freezing point.

MR. A. STUCKI: Having traveled by air to some extent, I was always interested in air transportation and often marveled at the relative safety of this kind of travel, brought about mainly by correct weather forecasts.

We have seen tonight pictures of electric storms, snow storms and other aerial upheavals, but to determine their coming is quite another matter.

Most of the readings by the United States Weather Bureau are taken at the surface of the earth, while, as I understand it, the air transportation companies, transcontinental and others, start by determining the masses of air moving, which after all produce all weather conditions. They take the readings of the air currents as to speed, direction, temperature, etc., great distances above the earth. And when for instance, they find a cold air current in the northwest starting south, and a hot air current in the Mississippi Valley going north, they know when and where the two masses will meet, and hence they can look out for the disasters shown us in many fine pictures tonight.

What I would like to find out from Mr. Brotzman is to what extent the United States Weather Bureau makes use of this method of forecasting the weather.

MR. BROTZMAN: The Weather Bureau is now making a study of Air Mass Analysis. Observations are taken by the use of air planes, and by the use of balloons. The observations by air planes are up to a height of 15 to 17 thousand feet, and with balloons, higher levels are reached. The data obtained in this way are charted on the so-called upper air maps, and on maps specially drawn to show the condition of the air mass.

MR. R. P. FORSBERG: You stated, if I understand you correctly, that sometimes during severe rain storms the humidity of the atmosphere is practically 100 per cent. What is the proper or desirable percentage of humidity of a living room at a temperature of 70 degree Fahrenheit?

MR. BROTZMAN: The Weather Buearu has made no experiments of this character, but, several years ago, an experiment of this kind was conducted by a medical doctor, who used rats for the experiments. He placed several rats in a pen where a humidity of 30 per cent was maintained; in another pen he kept the rats at a 50 per cent humidity, and in a third pen at 80 per cent humidity. After a certain time, he inoculated the rats with pneumonia germs. The rats in the 30 per cent humidity took pneumonia first. Those at 80 per cent took the disease next, and those in the 50 per cent humidity were the last to take pneumonia, and they had relatively mild attacks. The conclusion, as I remember, was that a humidity of 50 per cent is the best for health. If humidity in a room, during cold weather, is kept too high, there will be much condensation of moisture on windows and walls, which is objectionable.

MR. R. P FORSBERG. One other question and if it is not a fair one do not hesitate to say so and I will gladly withdraw it. Do you keep a record of the weather as it actually occurs and compare it with what you predicted it would be?

MR. BROTZMAN: A record is kept of all forecasts, and the forecaster is given a rating every month. The forecasts are correct 85 per cent of the time.

PRESIDENT: Mr. Turner, the Postmaster, in whose new post office building the Weather Bureau is now located, is present and we would be very much delighted to have a word from him.

HON. WILLIAM M. TURNER: When I came here tonight I did not expect to be called on to say anything. But my "tenant" has done a lot of talking, which I have enjoyed very much, and I also enjoyed his answers to those somewhat embarrassing questions as to why so many mistakes were made. I guess forecasting is something like guessing the action of the Pittsburgh stock market. I judge most of you, like myself, have tried to forecast it on many occasions.

It is certainly a pleasure to come here and be with you fellows and have the privilege of meeting you. Those who are interested very greatly in the transportation question, especially. Up until about eighteen months ago it did not interest me a bit. Since being appointed Postmaster of Pittsburgh it has become a most intensively interesting subject to me, because we use all methods of transportation in the postal service that are used in the world today. The principal ones are steamships, railroads and airplanes. The steamship I think is the slowest, the railroad service is the next, and the airplane is the fastest we have. I feel that we will have much faster transportation in all these lines. The railroads of course carry the bulk of the mail. Every postal employee, and there are about 700,000 of them, is interested in the transportation question, so that you have a big following in it. I hope, and I think it is your hope, too, that the air mail service will increase and that Pittsburgh will some day be one of the largest and best air ports and one of the most used in the country. There has been some controversy as to landing charges and other charges there without the proper consideration as to that portion of the mail service and the airship service, that is the service that is to be given by the airplanes. This should be the largest and one of the best, and I think it is the best airplane field I have ever been in, and these landing charges should be such that they would encourage the landing of all large airplanes in the country passing over this state.

The discussion around the dinner table was rather along the line of increased service and receipts of the railroads from postal service. And along the same line I would like to say that we have established a new department over there that I want you to become familiar with. We have many expert clerks who in handling the mail over twenty or twenty-five years have become familiar with almost everything in it. The envelope, whether it contains a love message or a bill or a dunning letter or money, they can almost tell as it passes through their hands what it is because they have handled so many of them. And I thought it would be a very nice thing for the tired business man and tired railroad man and bankers and doctors and everybody else, to give him a rest and to relieve him of a lot of trouble, so we thought the matter over and for a fee of $10.00 a year we will allow you to belong to this association. I have tried it myself and the results are very satisfactory. For that $10.00 we will take out of the mail all your bills and all your dunning letters. I have tried that myself, for I do not want to try to put anything over on any one else that I have not tried myself, and it reduces my mail 90 per cent. If any of you want to join this association, I have appointed Mr. Shingledecker Receiving Agent for the Association, and if you hand him the fee of $10.00 I will guarantee that most of you will have your mail relieved at least 90 per cent!

MR. C. O. DAMBACH: A prominent financier once made the remark that if he were right fifty-one per cent of the time he could make a lot of money, therefore since our speaker has evidently been correct eight-five per cent of the time in forecasting the weather, you will readily appreciate that he has been saving the railroads a good deal of money, not only by weather forecasts but also the accuracy with which he has forecasted the stage of water in our rivers when they reach the flood mark.

We have all been interested in looking at the slides showing how he does this and in order that we may show our appreciation for the very able discussion which we have listened to this evening, I move Mr. President that the Club extend a rising vote of thanks to Mr. Brotzman for his splendid address.

PRESIDENT: All those in favor of the motion will please rise. It appears to be unanimous. I will have to ask you to sit down again because the entertainment which was to have been given by the Music Committee before the regular program had to be postponed, and we are now to have another of the very enjoyable entertainments by the musical organization of the Railway Club.

After a delightful musical program, the President tendered the members of the Chorus and the Committee the thanks and high appreciation of the Club, and the meeting was adjourned to the tables spread at each end of the room.

J. D. CONWAY, Secretary.

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Organized October 18, 1901

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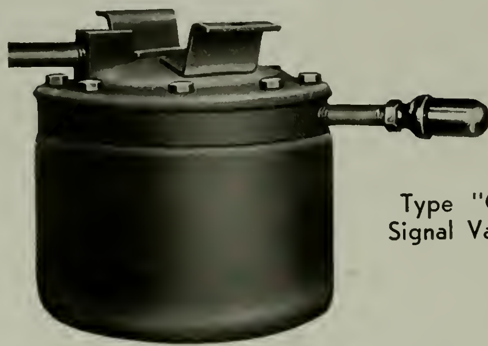
Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 7.

Pittsburgh, Pa., May 23, 1935

$1.00 Per Year
25c Per Copy



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*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
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GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

MAY 23, 1935

The meeting was called to order at the Fort Pitt Hotel at eight o'clock, P. M., with President Flinn in the chair.

Registered attendance, 302, as follows:

MEMBERS

Adams, Charles E.
Adams, F. W.
Allen, Harvey
Ambrose, W. F.
Ament, F. Chalmer
Anderson, H. N.
Babcock, F. H.
Baker, J. B.
Baker, W. E.
Barr, H. C.
Baughman, G. W.
Baumann, E. G.
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Beatty, Raymond N.
Beeson, H. L.
Berg, Karl
Bergman, C. R.
Best, D. A.
Bone, H. L.
Bradley, J. P.
Britt, T. E.
Buffington, W. P.
Burel, W. C.
Burnette, G. H.
Butcher, F. M.
Buzzerd, J. P.
Cannon, T. E.
Carlson, L. E.
Carmody, J. J.
Carr, T. W.
Carver, A. B.
Chaffin, H. B.
Chipley, G. R.
Christy, F. X.
Christy, G. J.
Cipro, Thomas
Clardy, W. J.
Code, C. J.
Code, J. G.
Conway, J. D.
Coombe, A. B.
Courtney, Harry
Cruikshank, J. C.
Cummings, Peter
Dambach, C. O.
Davis, Charles S.
Dean, E. E.
Denehey, Robert H.
Dierker, R. H.
Downing, J. A.
Durell, W. A.
Egly, M. J.
Emery, E.
Endsley, Prof. Louis E.
Escott, Charles M.
Evans, C. S.
Ferguson, R. G.
Fike, J. W.
Finegan, T. A.
Flinn, R. H.
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Forsythe, George B.
Fox, M. C.
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Freshwater, F. H.
Friend, E. F.
Frushour, H. T.
Fults, J. H.
Furch, George J.
Gatfield, Phillip
Goldstrom, G. E.
Gandy, Ralph H.
Gardner, George R.
Gauvey, Fred J.
Gellatly, William R.
Gilbert, William J.
Glaser, J. P.
Goda, P. H.
Grunden, B. C.
Hansen, William C.
Hansher, W. Edgar
Harbaugh, C. P.

Hawkes, T. L.
Hayward, C.
Heed, H. L.
Hemma, Charles H.
Hilstrom, A. V.
Holland, S. E.
Hoover, J. W.
Horne, J. S.
Huff, A. B.
Huston, F. T.
Hykes, W. H.
Johnson, J. W.
Johnson, L. H.
Keck, L. M.
Kellenberger, K. F.
Kentlein, John
Kessler, A. L.
Kirk, W. B.
Kiskadden, H. L.
Knable, G. Elkins
Krause, H. A.
Kruse, J. F. W.
Kuhn, S. H.
Kulp, J. G.
Kusick, Harry F.
Lanahan, Frank J.
Lanahan, J. S.
Larson, W. E.
Laurent, Joseph A.
Lear, E. J.
Lee, L. A.
Leet, C. S.
Lehr, Harry W.
Loder, C. C.
Logan, J. W., Jr.
Long, A. J.
Longstreth, W. L.
Lutz, Harry
Lynn, Samuel
Mahaney, A. R.
Maliphant, C. W.
Marble, A. E.
Masterman, T. W.
Mayer, L. I.
Menk, C. W.
Meredith, A. R.
Millar, C. W.
Miller, R. C.
Mills, O. B.
Morgan, H. C.
Mulvey, J. I.
Munn, Alex D.
McAndrews, T. E.
McCormack, E. S.
McCrea, J. G.
McCrossin, C. D.
McCuen, J. T.
McHail, J. L.
McIntyre, R. C.
McKay, N. H.
McKinley, A. J.
McKinley, John T.
McLean, J. L.
McMillan, A. P.
McQuiston, C. A.
McTighe, B. J.
Nichols, Samuel A.
O'Leary, J. J.
O'Sullivan, J. J.
Overholt, B. C.
Passmore, H. E.
Pearl, W. W.
Porter, H. N.
Posteraro, S. F.
Powell, H. C.
Prichard, Hugh R.
Purchard, Paul
Quinn, W. P.
Rankin, B. B.
Reed, E. S.
Reeve, George
Redding, P. E.
Redding, R. D.
Roberts, E. L.
Rodkey, C. C.
Rumbarger, F. A.
Rushneck, G. L.
Rutter, Harley E.
Ryan, J. M.
Sarchet, Roger
Satterfield, A. T.
Schadt, A. D.
Schaffer, George F.
Schaffer, W. E.
Schmidt, F. C.
Schrencongost, C. P.
Schultz, D. C.
Searles, E. J.
Seibert, W. L.
Sersch, J. G.
Servais, F. W.
Severn, A. B.

Shackelford, L. P.
Shellenbarger, H. M.
Sheridan, T. F.
Shuster, W. W.
Simons, Philip
Simpkins, Fred E.
Sipe, D. A.
Sixsmith, G. M.
Slater, A. H.
Smith, G. M.
Stevens, R. R.
Stewart, J. D.
Stoffregen, L. E.
Stucki, A.
Sutherland, Lloyd
Swope, B. M.
Taylor, H. D.
Ternent, H. J.
Teufel, W. O.
Thomas, H. N.
Tipton, G. M.
Tomasic, N. M., Jr.
Toussaint, Robert
Trax, L. R.
Triem, W. R.
Tryon, I. D.
Tucker, John L.
Van Blarcom, W. C.
Van Nort, C. W.
Van Vranken, S. E.
Vollmer, Karl L.
Vowinkel, Fred F.
Walter, E. R.
Warfel, John A.
Weaver, W. Frank
Weis, F. E.
West, G. S.
West, Troy
Whipple, A. L.
Whitehouse, E. L.
Wikander, O. R.
Williams, O. J.
Wilson, W. S.
Woodward, Robert
Wright, J. B.
Yarnall, Jesse
Young, J., Jr.

VISITORS

Anderson, H. E.
Barnum, H. M.
Bauer, F. Q.
Bruce, B. D.
Campbell, J. Harry
Davis, W. B.
Donaldson, S. E.
Doole, John
Eichner, John
Enzie, P. L.
Felton, F.
Fierstone, C. K.
Fitzpatrick, James J.
Forster, Walter
Foust, R. K.
Frazier, J. M.
Garland, J. W.
Gardner, G. A.
Gatfield, William
Goodwin, A. E.
Harkenrider, T. A.
Harris, B. O.
Hawk, Robert
Helwig, H. T.
Henry, M. E.
Hopkins, J. G.
Jacobson, H.
Kacy, R. A.
Kelly, W. A.
Letterman, H. C.
Lewis, S. B.
Loder, C. C., Jr.
Loudermilk, J. S.
Low, Warren C.
Lumpp, R. J.
Lytle, C. F.
Maczko, A. S.
Marshall, L. L.
Meixner, J. Edward
Miller, Paul
Mitchell, F. K.
Morgan, J. E.
McCandless, William A.
McCreary, C. T.
McDermott, W. W.
McVicker, J. W.
O'Brien, J. J.
Ovyjett, Carl
Oyens, L.
Power, G. T.

Reynolds, D. E.	Van Pelt, R. T.
Riddle, F. L.	Van Wormer, G. M.
Rodkey, E. G.	Veltri, Frank
Sanford, William	Veltri, Gabriel
Shields, James V.	Veltri, Peter
Smith, Sion B.	Vollmer, Paul F.
Snyder, M. F.	Vollmer, W. K.
Stoner, H. E.	Weis, Helen
Sweeney, M. S.	White, W. B.
Terkelsen, B.	Wilcox, Walter

Young, C. R.

Before entering upon the business session a "community sing" was led by Mr. Frank E. Weis, with Mrs. Weis at the piano, which was taken up with great enthusiasm by the audience.

PRESIDENT: We will dispense with the roll call as the attendance record is taken care of by the registration cards which I hope you have all signed.

We will also dispense with the reading of the minutes of the last meeting, if there is no objection, as the printed Proceedings have been in your hands for more than a week.

The next order of business is the reading of the list of new members. For the first and the only time during the year the Club will refuse to take in any new members. That may surprise some of you, in view of the strenuous efforts the Membership Committee has been making to bring new members into the Club. I have here a bunch of applications for membership. If you read the application blank you will find that the membership fee is $3.00 for each fiscal year or part thereof, except those proposed in September or October. Those proposed in these months will be credited upon payment for the following fiscal year. So we will hold the applications that are in and introduce them at the September meeting, giving them a bargain rate for their three dollars of a fourteen months membership. I want these applicants to understand that they are members of the Club and fully welcome to the meeting.

Mr. Secretary, are there any announcements or communications?

SECRETARY: Since our last meeting we have received information of the death of one of our members, Charles Fair, Foreman Car Repairs, Pennsylvania Railroad, Pittsburgh, Pa., died March 7, 1935.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings. In this connection I might say that Mr. Fair was one of the large group of Pennsylvania Railroad men which our good friend Sixsmith brought into the Club at the November meeting. I am sure he would have become a valuable member of the Club had he been permitted to live. He was at several meetings before he was called away.

Before going to the paper of the evening, we have one matter of business that is quite important. We have had a number of changes made in our proceedings in the last year, such as the enlargement of the Membership and Reception Committees, the creating of an Advertising Committee, and other changes of that sort from time to time have been passed on and approved by the Executive Committee and put into effect by vote of the Club. So some of us thought it was time to look over our Constitution and By-Laws and see what amendments might be desirable to fully legalize the things that have been done and make them a permanent part of the organization of the Club.

The method for amendment of our Constitution and By-Laws, as prescribed by our law, is "by written request of ten members, presented at a regular meeting, and a two-thirds vote of the members present at the next meeting". After a very careful examination by the Executive Committee a series of amendments to the present Constitution and By-Laws has been prepared, to make effective and permanent the changes that have been put into operation during the past year, and a Petition for Amendment has been signed by the necessary number of members and is now presented to the Club, as follows:

Pittsburgh, Pa., May 23, 1935.

To the Officers and Members of The Railway Club of Pittsburgh:

We, the undersigned members of The Railway Club of Pittsburgh, in accordance with Article VII of the Constitution and By-Laws, hereby request the attached amendments be presented at this regular meeting and voted upon at the next regular meeting.

(Signed)	Frank J. Lanahan,	Louis E. Endsley,
	W. S. McAbee,	C. O. Dambach,
	R. H. Flinn,	J. D. Conway,
	A. Stucki,	D. F. Crawford,
	Samuel Lynn,	F. I. Snyder.

In accordance with this petition the proposed changes in the Constitution and By-Laws were presented at meeting of May 23, 1935, as follows:

CONSTITUTION

(Present)

ARTICLE III

Membership

Section 2. Persons may become honorary members of this Club by a unanimous vote of all members present at any of its regular meetings, and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

(Proposed)

ARTICLE III

Membership

Section 2. Persons recommended by the Executive Committee and by unanimous vote of all members present at any regular meeting of the Club may be made an Honorary Member and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

(Present)

ARTICLE IV

Officers

The officers of this Club shall consist of a President, First Vice President, Second Vice President, Secretary, Treasurer, Finance Committee consisting of five or more members, Membership Committee consisting of seven or more members, Entertainment Committee consisting of three members, Reception Committee consisting of six or more members, Subject Committee consisting of three or more members, and an Elective Executive Committee of three or more members. The officers named shall serve a term of one year from date of their election, with the exception of the Finance, Membership, Entertainment, Reception and Subject Committees; the term of office of these committees shall be specified at the time of the Annual Election, but the term of office of the members of such committees shall not exceed three years.

(Proposed)

ARTICLE IV

Officers

The officers of this Club shall consist of a President, First Vice President, Second Vice President, Secretary, Treasurer and an Executive Committee of seven or more members, elected at the Annual Meeting of the Club, for a term of one year. There shall be a Finance Committee of five or more members; a Membership Committee of twelve or more members; an Entertainment Committee of seven or more members; a Reception and Attendance Committee of twelve or more members; a Subject Committee of three or more members; and an Advertising Committee of three or more members; all elected at the Annual Meeting, the term of office to be specified, but in no case to exceed three years. Chairmen and Vice Chairmen of these committees where not named on the ballot will be selected from among the elected members by the Executive Committee.

(Present)

ARTICLE V

Duties of Officers

Section 2. The First Vice President, in the absence of the President, will perform all the duties of that officer; the Second Vice President, in the absence of the President and First Vice Presi-

(Proposed)

ARTICLE V

Duties of Officers

Section 2. The First Vice President, in the absence of the President, will perform all the duties of that officer; the Second Vice President, in the absence of the President and First Vice Presi-

dent, will perform the duties of the presiding officer. The First and Second Vice Presidents shall also serve as members of the Executive Board.	dent, will perform the duties of the presiding officer. The First and Second Vice Presidents shall also serve as members of the Executive Committee.
Section 5. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds. The elective members of this Committee shall also perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so.	Section 3. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds.
Section 3. Changed to Section 4 (Only change is in the section number).	Section 4. The Secretary will attend all meetings of the Club or Executive Committee, keep full minutes of their proceedings; preserve the records and documents of the Club, accept and turn over all moneys received to the Treasurer at least onec a month, draw cheques for all bills when approved by a majority of the Executive Committee present at any meeting of the Club or Executive Committee meeting. He shall have charge of the publication of the Club Proceedings and perform other routine work pertaining to the business affairs of the Club under direction of the Executive Committee.
Section 4. Changed to Section 5 (Only change is in the section number).	Section 5. The Treasurer shall receipt for all moneys received from the Secretary, and deposit the same in the name of the Club within thirty days in a bank approved by the Executive Committee. All disbursements of the funds of the Club shall be by check signed by the Secretary and Treasurer.
Section 6. (New Section).	Section 6. The Subject Committee will arrange programs and select speakers for the regular meetings of the Club and perform such other duties as may be assigned them by the President or First and Second Vice Presidents, working in conjunction with the Entertainment Committee as may be required. The Chairman of the Subject Committee will serve as an advisory member of the Executive Committee.
Section 7. The Membership	Section 7. The Membership

Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents and such other duties as may be proper for such a committee.

Committee will actively engage in building up and maintaining the list of active members of the Club and perform such other duties as may be assigned them by the President or First and Second Vice Presidents. The chairman of this Committee will serve as an advisory member of the Executive Committee.

Section 8. (New Section).

Section 8. The Advertising Committee will solicit advertisements for the Official Proceedings and perform such other duties as may be assigned them by the President or First and Second Vice Presidents. The Chairman of this Committee will serve as an advisory member of the Executive Committee.

Section 9. (New Section).

Section 9. The Reception and Attendance Committee will receive members, guests and visitors at the meetings and generally assist in promoting social intercourse and good fellowship, securing attendance of the members, and performing such other duties as may be assigned them by the President or First and Second Vice Presidents. The Chairman of this Committee will serve as an advisory member of the Executive Committee.

Section 8. (Changed to Section 10) Only change is in the section number.

Section 10. The Entertainment Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents, and such other duties as may be proper for such a committee.

Section 6. The Finance Committee will have general supervision over the finances of the Club, and perform such duties as may be assigned them by the President or First and Second Vice Presidents.
(Changed to Section 11)

Section 11 The Finance Committee will perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so and perform such other duties as may be assigned them by the President or First and Second Vice Presidents.

ARTICLE VI
Election of Officers

Section 2. Printed forms will be mailed to all the members of the Club, not less than twenty days previous to the Annual Meeting by the elective members of the Executive Committee. These forms shall provide a method, so that each member may express

ARTICLE VI
Election of Officers

Section 2. The President will appoint a Nominating Committee of five members, three of whom must be regularly elected members of the Executive Committee, who shall at the September meeting recommend nominations for all offices to be filled at the an-his choice for the several offices to be filled.

nual meeting and these, together with any other nominations which may be made from the floor under proper procedure, will be printed and mailed as a letter-ballot to all of the members of the Club, not less than twenty days previous to the Annual Meeting, by the elective members of the Executive Committee. Each member may express his choice for the several offices to be filled by properly marking the letter-ballot and returning it to the Chairman of the Executive Committee.

BY-LAWS

ARTICLE II

Quorum

At any regular or special meeting nine members shall constitute a quorum.

ARTICLE IV

Order of Business

1. Roll call.
2. Reading of the minutes.
3. Announcements of new members.
4. Reports of Committees.
5. Communications, notices, etc.
6. Unfinished business.
7. New business.
8. Recess.
9. Discussion of subjects presented at previous meeting.
10. Appointment of committees.
11. Election of officers.
12. Announcements.
13. Financial reports or statements.
14. Adjournment.

ARTICLE V

Subjects—Publications

Section 1. The Subject Committee will provide the papers or matter for discussion at each regular meeting.

Section 2. The Proceedings or such portion as the Executive Committee may approve shall be published (standard size. 6 x 9 inches) and mailed to the members of the Club or other similar clubs with which exchange is made.

ARTICLE II

Quorum

At any regular or special meeting twenty-five members shall constitute a quorum.

ARTICLE IV

Order of Business

1. Roll call.
2. Reading of the minutes of preceding meeting.
3. Reception of new members.
4. Announcements and communications.
5. Appointment of committees.
6. Reports of officers or committees.
7. Unfinished business.
8. New business.
9. Election of officers.
10. Presentation of program and discussion.
11. Adjournment.

ARTICLE V

Subjects—Publications

Section 1. (Provided for in Constitution, Article V, Section 6).

Section 1. The Proceedings or such, etc. (No change other than section number).

PRESIDENT: It is my thought that we should entertain a motion to have these proposed amendments printed in the Proceedings of this meeting, so the members will have opportunity to look them over and compare them with the present Constitution and By-Laws, which are always printed in the Proceedings of the Annual Meeting, so the vote may be taken intelligently at the next meeting.

MR. FRANK J. LANAHAN: I make such a motion, that the proposed amendments be printed in the next issue of the Proceedings in parallel column with the present Constitution and By-Laws, that we may be ready to vote intelligently at the next regular meeting of the Club.

The motion was duly seconded and carried and it was so ordered.

PRESIDENT: Tonight we will introduce a somewhat different program from what we have been accustomed to. I have thought for a long time that we have not properly recognized the "Department of Railway Security," which is actually engaged all the time in taking care of us and doing things that many of us know very little about. At a meeting of the Subject Committee I proposed that we have at some time in the year a "Police Night," and this is it. We have a very fine program, and Mr. C. K. Fierstone, Special Agent in charge of the Pittsburgh Office of the Federal Bureau of Investigation, has consented to address the Club on "The Work and Functions of the Federal Bureau of Investigation." This will be an especially interesting paper to the members of the Club and it is with a great deal of pleasure and as a distinct privilege that I introduce to you Mr. Fierstone, who will address you on the subject stated.

THE WORK AND FUNCTIONS OF THE FEDERAL BUREAU OF INVESTIGATION

By C. K. FIERSTONE, Special Agent in Charge, Federal Bureau of Investigation, U. S. Department of Justice, Pittsburgh, Pa.

Mr. President, Secretary, and members of the Railway Club of Pittsburgh—

Not only for myself, but on behalf of the Director of the Federal Bureau of Investigation, Mr. John Edgar Hoover, let me express my appreciation for this opportunity to appear before you this evening. In the brief time at my disposal I hope to give you some clear conception of the work and functions of the Federal Bureau of Investigation of the United States Department of Justice.

This organization does not investigate violations of every Federal law. It is necessary at the outset to eliminate those violations which, by Congressional enactment or otherwise, are specifically delegated to other investigative agencies.

This Bureau does not investigate violations of the Narcotic Laws, Counterfeiting, Smuggling, Immigration, or Postal Laws. It does, however, investigate practically every other violation of Federal Statutes. To mention a few, we investigate violations of the Bankruptcy Act, Copyright Act, Crimes on Indian or Government Reservations, Frauds Against the Government, National Motor Vehicle Theft Act, commonly termed the Dyer Act, White Slave Traffic Act, also known as the Mann Act, and the National Bank Act.

Of course, as you know, Thefts From Shipments moving in Interstate Commerce are also handled by this Bureau. And, in addition, by reason of comparatively recent legislation this Bureau is now charged with investigations of robberies of National Banks, Extortion, and Kidnaping cases.

It may interest you to know that until about a year ago it was not a Federal offense to kill or assault an officer of the Bureau of Investigation, nor was it a Federal offense to rob a depository of United States funds, as long as it was done with a machine gun or other deadly weapon; if a man merely embezzled money he could be sent to a Federal Penitentiary, but if he endangered the lives of bank officers or bank customers and took their money by force, only State officials could pursue him.

Until about a year ago Special Agents of the Bureau of Investigation did not have the power of arrest in the full meaning of the law. They did not have the right to carry arms. These situations have now been corrected.

The Bureau of Investigation has now become a militant law enforcement agency. Every Special Agent is a crack shot with the rifle, machine gun, pistol, shotgun, and tear gas weapons, but because he knows how to use these implements of legitimate warfare is no reason to believe that the Bureau of Investigation is an organization of killers running wild and shooting at random.

In every instance effort is made to bring about a peaceable arrest. As an example of that it is only needed to recall the recent occurrence in New York City when one of the most desperate gangs known in recent years, the notorious tri-State gang, which included two men who had escaped from the death cell while waiting execution, were captured without the firing of a single shot.

It requires a comprehensive organization to investigate the large number of important Federal crimes throughout the United States and its territories each year. In order to perform this work most expeditiously and economically the Bureau has offices in thirty-three cities located throughout the United States. This total will be increased by two in the immediate future. Investigative activities are not limited by State boundary lines. In fact, the Bureau was created for the purpose of affording a mobile force which could be quickly moved from one part of the country to another as the occasion for its services demanded. Therefore, as the occasion arises the number of Agents assigned to each field office varies with the amount of work to be performed. For instance, if the number of cases in the territory covered by the Jacksonville, Florida office is comparatively few while the number of cases in the territory covered by the New York office is unusually large, Agents may be shifted from Jacksonville to New York, or from Portland to Philadelphia, or from Los Angeles to Pittsburgh, as the occasion demands. This is, of course, a distinct advantage and permits thorough and prompt attention to be given to every case referred to the Bureau of Investigation.

Naturally, with such a small number of Agents to whom is entrusted the investigation of Federal laws, over such a vast territory, it is necessary that most careful consideration be given to the selection and appointment of all its employees. Only qualified graduates of recognized law schools, who are usually members of the Bar, or expert accountants with practical experience, or experienced investigators are appointed as Special Agents. Applicants for appointment must be between the ages of twenty-five and thirty-five. Upon their appointment Special Agents are given intensive training at Washington. This course takes twelve weeks, during which all Agents are required to master all phases of their work, including practical instruction in the use of all types of firearms.

Statistics, at best, are rather dry, but they do offer the most concise method of outlining the achievements of the Bureau. I know that you will be interested to learn that during the fiscal year of 1934 convictions were obtained in over ninety-three per cent of all cases investigated by the Bureau which were brought to trial. During that same year over thirty-five hundred convictions were obtained. This means an average of almost ten convictions for every day in the year. Sentences imposed in these cases included eleven life sentences and over five thousand years. In addition, there were probationary sentences of twenty-five hundred years and suspended sentences of one thousand years. Fines imposed during the same period approximatel nearly three quarters of a million dollars.

You will be interested to know that the total savings and recoveries effected by the Federal Bureau of Investigation for the year amounted to nineteen million, two hundred sixty-nine thousand, fifty-nine dollars and sixty-seven cents. During the same period, almost one thousand Federal fugitives from justice were located, an average of from between two and three each day in the year. Twenty-three hundred stolen motor vehicles, valued at a little less than one million dollars, were recovered.

The more spectacular of the Bureau's work, of course, finds its way into the public press and there is no need for me to recount cases of that character. However, there is a division in the Federal Bureau of Investigation which is vital to the success of the Bureau's work and which, in its quiet and modest way, is regularly performing every day work as important and valuable to the safety of the country as that performed when Dillinger, Floyd, and the Barkers were shot down. This is the Identification Division, which was established eleven years ago to operate as a national clearing house of identification data.

Beginning with approximately eight hundred thousand fingerprint records at that time it has now grown to a point where there are more than five million fingerprint records on file. This represents the largest and most complete collection of criminal fingerprint records of current value existing anywhere in the world. Eight thousand two hundred eight-five contributors in the United States and foreign countries add to this collection. Almost three thousand fingerprint cards are received each day.

You will be interested to learn that over forty-seven percent of all prints received are identified as having prior criminal records. This division at the present time identifies about three hundred seventy-five fugitives each month. At the present time the Identification Division of the Bureau exchanges fingerprint records with sixty-five foreign countries to help cope with the operations of international confidence men, smugglers, and gangsters.

As an adjunct to its main fingerprint files the Bureau is now conducting a single fingerprint file wherein single fingerprint impressions of known gangsters, bank robbers, kidnapers, and extortionists are classified and filed separately so that they may readily be compared with latent prints found at the scene of a crime. In this manner the fingerprints of more than eleven thousand such criminals have now been so segregated in this special file. Individual photographs further supplement this valuable adjunct to the Identification Division.

There is another function which this Identification Division serves and that is the determination of criminal records of individuals in civil life. About six years ago the United States Civil Service Commission began routing its fingerprints through the Identification Division.

During the fiscal year 1929 one person in every thirteen was found to have a criminal record. The next year one person in every fourteen was discovered to be a criminal. These crimes varied in type from disorderly conduct to counterfeiting, burglary, and murder. After the publicity given to these searches the word passed to some extent that it was unsafe for persons with criminal records to take a Civil Service examination. Thereupon the ratio dropped to one out of every twenty-two. It has now fallen to the extent to where one person out of every forty-two who applies for a Civil Service job is found to have a criminal record.

Many interesting cases have been brought to light in connection with the search of fingerprint cards of applicants. During March of this year there were received from the Police Department at Miami Beach, Florida the fingerprints of over twelve hundred applicants for positions in the various resort hotels and amusement enterprises at that point. Eighty-two of these persons were found to have criminal records and twelve had served penitentiary sentences for such offenses as breaking and entering, grand larceny, and manslaughter.

About a year ago the Bureau received over four hundred fingerprint cards from the Police Department at San Francisco in cases of applicants for positions as Special Agents of that department. Thirty-four of these applicants were found to have previous records on file in the Bureau's Identification Division and several had served substantial penitentiary sentences for such crimes as larceny, burglary, and assault with intent to kill.

There is also a case which was revealed a few years ago when an individual at Detroit, Michigan made application for the position of Federal Prohibition Agent. When his fingerprints were sent to the Bureau of Investigation for search it was found that he was an escaped prisoner from the Texas Prison at Huntsville, where he had been serving a five-year term for robbery and burglary.

Also, maintained in connection with the single fingerprint section, a bank robbery modus operandi file is kept wherein is filed information concerning the method of operation employed in the robbery of banking institutions. There are at present over five hundred cases on record in this file and there have been noted similarities between robberies in two score cases.

There is one section of this Identification Division which is assuming larger public interest and importance. This is the Civil Identification Section. Fingerprints by the hundreds of individuals from all over the United States, who desire to have their fingerprints on file in the Civil Identification Section at Washington as a matter of record and protection, are voluntarily contributing their fingerprints. This section, of course, is maintained as a completely separate section in the Identification Division entirely apart from the Criminal Identification Section.

Persons who fear accident or death, illness, or kidnaping, and persons of prominence who suffer through the activities of impersonators are filing their fingerprints in the Civil Identification Section of the Identification Division. The possibilities for using fingerprints in civil, business, and private life are very numerous.

It is believed that the filing of a civil identification record may frequently be a protection to the law-abiding citizen. It will make possible the establishment of an identification in the event he becomes a victim of amnesia or other serious illness, or in case of death. The identification of bodies of disaster victims is frequently difficult. In some instances such persons have been buried without identities being established. The recording of non-criminal fingerprints with the Civil Identification Section precludes the possibility of an identity remaining unknown for any considerable time.

These records should also be of assistance in settling controversies over the payment of life insurance claims.

At the Bureau's headquarters in Washington criminal evidence is now going under the microscope. In the latter part of 1932 the Bureau of Investigation established a Technical Laboratory to perform work of a scientific character which might prove of assistance in the investigation of cases. Previously it had been the custom to have technical experts outside the organization make scientific analyses. The importance and growth of this phase of the Bureau's investigative activity and the desirability of having the work under close supervision led to the establishment of this Technical Laboratory.

The development of this Laboratory has been carefully planned by the Bureau with the assistance and advice of known and recognized authorities in the field of scientific endeavor.

Some of the instruments used in the technical work include the comparison microscopes, by which the images of two separate objects, such as bullets, are brought within a single eyepiece in juxtaposition for ready comparison; the binocular microscopes of low magnification for the examination of handwriting and typewriting and other specimens in which it is an advantage to utilize the stereoscopic principle; the research microscope which provides magnification of over two thousand times; the ultra-violet ray lamp for the examination of the fluorescent and phosphorescent appearances of objects and substances through which they may be identified; special cameras for photographing specimens; chemical apparatus for the examination of blood stains; qualitative and quantitative analyses; delicate balances; projection arc, employing the use of parallel rays of light, and similar instruments.

At the present time examinations are made in the laboratory of documents and letters to determine the identity of typewriting or handwriting, as well as the existence of water-marks and any other information which may prove helpful in the investigation of the case. In addition, an important phase of the scientific work relates to the examination of bullets and exploded shells. Reproduction by moulage and other methods is another feature which the Laboratory is equipped to undertake. Micro-analyses of hair and textile fabrics are likewise considered as an essential and important part of the technical duties, and chemical analyses of stains including blood tests are performed.

Reference collections have been assembled consisting of an index of paper water-marks; blueprints of automobile tire tread designs; types, and sizes of bullets and cartridge cases; typewriting specimens; handwriting specimens of certain types of individuals; and animal and vegetable fibres.

A recent extortion case in which the Bureau had investigative interest may be cited as an example of the use of the science of fingerprints in the detection and prosecution of crime.

In late 1932 and early 1933 a prominent manufacturer in North Carolina, received fourteen communications demanding substantial ransom under threat of kidnaping both his two-year old granddaughter and his own eighteen-year old son. An officer of the Charlotte, North Carolina, Police Department was able to develop a fingerprint impression on the back of one of the letters. This print was photographed and the Federal Bureau of Investigation circularized copies of it to the leading identification bureaus throughout the country, with the request that it be searched through the single fingerprint files where they existed in the hope that it might be identified with fingerprint cards which might pass through their hands.

During an effort to collect the ransom by means of an elaborately planned scheme two individuals were taken into custody by police officers and Agents of the Federal Bureau of Investigation. These individuals at first denied complicity in the crime but subsequently confessed. The prints of one of these individuals were taken and it was found that the latent prints developed on the extortion notes were identical with this individual's right forefinger.

Evidence of this identification was introduced at his trial at Atlanta, Georgia, and was an incidental factor in his conviction which led to a sentence of fifteen years in the United States Penitentiary.

The identification of fingerprints was a very material factor in the conviction of Evelyn Frechette, charged with the conspiracy to harbor John Dillinger. After the escape of Dillinger from the County Jail at Crown Point, Indiana, in March of 1934, Evelyn Frechette rented an apartment in Minneapolis and later another apartment in St. Paul for the purpose of concealing this fugitive. This woman had been previously arrested with Dillinger at Tuscon, Arizona. She was indicted by a Federal Grand Jury in April, 1934 and was tried the following month. At the trial fingerprint experts of the Federal Bureau of Investigation introduced latent fingerprints found in the apartment at St. Paul which were definitely established to be those of Dillinger, of Frechette, and several other notorious criminals.

This evidence definitely established the presence of both Dillinger and Frechette in the apartment and led to the conviction of Evelyn Frechette and her sentence to serve two years in the penitentiary and to pay a fine of one thousand dollars.

I have mentioned before the international exchange of fingerprints between the Federal Bureau of Investigation and similar bureaus in sixty-five foreign countries. You will be interested to know what relatively recent accomplishments have been effected by means of this exchange.

Just about a year ago the fingerprints of one Ivan Karkovic, who had been arrested by the Immigration and Naturalization Service here in Pittsburgh for violation of the Immigration Laws, were forwarded by the Federal Bureau of Investigation to the Bureau of Identification at Vienna, Austria for the purpose of ascertaining his criminal record as disclosed by the files of that Bureau. In a reply from the Austrian authorities it was noted that this person was possibly identical with one Ivan Karkovic, who was at that time wanted in Vienna. The report stated that he was strongly suspected of having misappropriated the strong box of some Cracovian merchants containing over ten million kronen. On the receipt of this information the authorities of the Immigration and Naturalization Service were notified. In connection with the charges against him in this country for illegal entry he was sentenced to the United States Penitentiary at Lewisburg in August of last year to serve a term of one year and one day. The report of the Inspector in Charge of the Immigration and Naturalization Service at Pittsburgh states that after the termination of this sentence Karkovic will undoubtedly be deported to Yugoslavia. Appropriate steps may then be taken by the Austrian authorities to secure his custody in connection with their charge.

Day by day the old alibi of mistaken identity is made more difficult to claim. It no longer assists the criminal to say that his name is John Jones while the wanted man's name is Henry Smith, because when the ten prints of his fingers go into the Identification Division of the Federal Bureau of Investigation, the infallible record is there and the mark of his digits say that he is the wanted man, and there is no possible manner in which the identity can be denied.

Scientific examination of materials in the course of an investigation may serve the innocent as well as convict the guilty. A striking example of this was found in a recent extortion case investigated by the Special Agents of the Bureau of Investigation. During 1932 and 1933 a prominent Court official at Ripley, Mississippi, received a series of anonymous letters demanding sums of money ranging from one thousand dollars to thirty thousand dollars and threatening death to both himself and his family if the money were not paid. A local individual who had lost considerable money in business ventures and who had been regarded at one time as of unsound mind was suspected of being the author of these threatening letters. The extortion notes, together with specimens of the handwriting of the suspect, were forwarded to the Technical Laboratory at Washington, D. C. The examination made there clearly showed that the suspect did not write the extortion letters.

While the threats were being made against the life of the victim a bomb was exploded in his home and a subsequent letter indicated that this explosion had resulted as a part of the extortion plot. During the course of their investigation the Bureau's Agents received information that an individual who lived about thirty miles from Ripley had been seen with three sticks of dynamite before the explosion, at which time he had made the statement that he was going to dynamite the home of the Court official. This new suspect and two others were taken into custody. He denied writing the extortion notes but when samples of his handwriting were forwarded to the Technical Laboratory at Washington the experts there reported that the writing was identical with that on the extortion notes in spite of deliberate attempts at disguise. Envelopes found in his home after his arrest were identified in the Technical Laboratory as being identical with envelopes used to transmit the extortion notes. Experts from the Technical Laboratory testified at the trial in this case and after presentation of the Government's evidence the suspect changed his plea to guilty. He was sentenced to serve twenty years in the Federal Penitentiary, and his co-defendants were sentenced to serve ten and seven and one-half years, respectively.

Many other cases could be cited where in the recent work of the Bureau the examination by the Technical Laboratory of the Bureau at Washington have determined beyond any question of doubt the identity of the perpetrators of extortion and kidnaping plots by means of comparison of both handwriting and typewriting.

We look upon great industrial enterprises as big business. The biggest business, however, in the United States is that of stealing, thieving, robbing, kidnaping, and murdering. Figures have been compiled showing fifteen billion dollars as the cost of the criminal industry. This figure is not a fanciful one; it is rather an absurd minimum and based upon the belief that every criminal costs no more than one thousand dollars a year.

When we look upon the records of such cases as the Urschel Kidnaping, in which Machine Gun Kelly was chased twenty thousand miles before he was captured; when we look upon the case of Frank Nash, whose activities, with those of his associates, in the trail of destruction, murders, kidnaping, suicide, and gangster killings, in addition to the numerous banks which they robbed, you will find the cost running well into the millions. Endlessly, other examples of this type could be cited.

In conclusion, I can do no better than to quote the words of our Director, Mr. John Edgar Hoover, on the occasion of his address before the Chamber of Commerce of the State of New York in New York City several months ago when he said, "A great part of the tremendous crime problem which exists today is due to the fact that otherwise upright persons condoned certain acts during recent years and allowed a condition of laxity to spread until it has infiltrated every portion of our Commonwealth. It is the citizens' duty to see that something is done about this. The Federal Bureau of Investigation hopes that it can point the way by the giving of its scientific training, of its tremendous crime laboratory, of its great fingerprint system built up through years of arduous effort, and plus all this the courage and nobility of hard-working men, whose suffering in this cause includes even that of their lives.

The Department of Justice hopes to enlist the interest and "active support of the American people in their respective communities in a sustained national movement to deal with the criminal menace."

I thank you.

PRESIDENT: We have read a lot in the newspapers and magazines about the "G-men". Here is one of them with us tonight ready to answer questions and discuss with you anything that may come to your minds that may properly be discussed, and I am sure there are some of you who have questions you want to ask or something you want to say about this very interesting talk we have had tonight, and I am now throwing the meeting open to general discussion. I wish to say again that I have no stooges in the audience and have not made any arrangements for any discussion and if any of you have anything you want to say you will have to get up and do it yourself.

MR. A. STUCKI: I would like to know whether fingerprints can be duplicated or reproduced to any extent.

MR. FIERSTONE: You mean whether different people may have identical fingerprints? In our collection of more than five million fingerprints we have not yet found a single case of a duplicate set of fingerprints. We do not believe it is possible. We have never found such a case. Some fanciful figures have been given that if the whole population of the world were multiplied by one hundred there might be one duplicate found.

MR. STUCKI: Do I understand that a fingerprint cannot be reproduced?

MR. FIERSTONE: Fingerprints are a natural part of the body; they are the little ridges and bulbs of your finger tips. They vary with every individual. We have never found any two identical sets of fingerprints.

QUESTION: Do you take the original fingerprints here and send that to Washington or do you keep the original here?

MR. FIERSTONE: We take the original fingerprints here and they are all sent to Washington for filing.

QUESTION: I was interested to know how you file the five million prints in order ever to find them again.

MR. FIERSTONE: I am not an expert in that end of it. Fingerprints are classified and there are ten hundred and twenty-four main classifications, as well as one hundred thousand or more minor classifications, so ordinarily there are not more than fifty cards in any one group of a similar classification. There are a few groups though that run into the hundreds.

QUESTION: I am wondering whether one can modify his fingerprints by disfiguring his hand.

MR. FIERSTONE: Experience has shown that it is practically impossible to remove those ridges. When they are damaged, as by accident or acid and the new skin grows back it reproduces the original ridges. Attempts have been made to alter or remove them. So far they have been unsuccessful.

MR. S. E. VANVRANKEN: Are the prints of the individual fingers on the same individual the same so that the print of one finger will answer the purpose?

MR. FIERSTONE: They are not. It is necessary to use all ten fingers to effect a classification.

MR. W. F. WEAVER: Thirty years ago I was interested in this fingerprint business. At that time in making classifications you had certain set numbers, dividing the hand by those numbers in order and in that way breaking down the classifications. Is there anything of that sort in use now?

MR. FIERSTONE: Yes, there is an arbitrary numerical value given to each finger. In addition there are some nine principal patterns, and beginning with these as the primary classification, sub-classifications are made according to types and ridge-counts.

MR. JOE BAKER: Is there any difference in fingerprints as one grows older, prints for instance of an individual thirty or forty years old as compared with prints of someone two or three years old?

MR. FIERSTONE: Yes and no. Of course, when one is very young his fingers have not yet attained their full growth, and when the individual reaches adult age, the pattern is enlarged. The original ridges, however, would still be there, unchanged and unaltered. They would naturally expand as he grew older.

MR. BAKER: How about fingerprints taken of a corpse as compared with those of a living person?

MR. FIERSTONE: We have taken fingerprints within a day or a week after death. Of course as the flesh decomposes it will affect the print. It all depends on the degree of decomposition of the body after death.

QUESTION: I would like to find out if fingerprints will give any other information than personal identification. Can you determine the height of a man, for instance, from his fingerprints?

MR. FIERSTONE: No. Nothing can be determined from fingerprints except a definite identification.

MR. F. J. LANAHAN: Is there any general similarity in fingerprints or anything that tells you the moral status of an individual or his tendency to crime? Take these men you have mentioned in the segregated group, is there any similarity that will show a life tendency which you can discover in these prints?

MR. FIERSTONE: Fingerprints indicate nothing at all, except a definite identification.

QUESTION: Will a fingerprint show an investigation made at the scene of another crime?

MR. FIERSONE: I am not sure that I understand the question.

QUESTION: Like a photograph of a print taken at the scene of a particular crime.

MR. FIERSTONE: No, the fingerprint is created by the excrescences from the sweat pores in the ridges of the fingers. If you examine your finger tips very closely you will find there are sweat pores in those little ridges. It is those sweat pores that make latent fingerprints. When the finger is placed on anything the print of that finger remains there. You may not be able to see it, but it may be brought out by the use of powders and photographed.

QUESTION: Is there close similarity between the fingerprints of twins? Or of quintuplets?

MR. FIERSTONE: There might be but not necessarily; in twins they vary; in quintuplets also.

PRESIDENT: Is there anyone else that cares to ask anything?

QUESTION: Can you distinguish between male and female by the fingerprints?

MR. FIERSTONE: No.

MR. LANAHAN: You mentioned Dillinger a while ago. I have taken a considerable interest in him. He is said to have paid a surgeon a big price to have his fingerprints marred or erased. It would be interesting to know what he did and what effect it had.

MR. FIERSTONE: He is reported to have spent five thousand dollars to have his fingerprints changed. After he was killed a set of his prints was taken by our Agents. They were somewhat mutilated. Court decisions hold that twelve points of similarity between prints is sufficient to establish definite identity. The comparison of the prints of John Dillinger after he was killed with a set of his prints taken before showed over three hundred points of similarity.

MR. LANAHAN: This face-lifting business. Just what portion of the anatomy, neck or ears or physiognomy, did he have changed that could make such a difference that he could not be recognized?

MR. FIERSTONE: I do not know much about that. That is more a matter of surgical treatment. As I understand it they cut the skin along the brow or along the neck and pull the skin up and under and thereby erase certain wrinkles and change the facial expression.

QUESTION: It is known that physicians are able to slow down perspiration, to stop excessive perspiration, and possibly to stop it altogether. If they can retard or stop the perspiration does that not stop the excretion that causes the fingerprint?

MR. FIERSTONE: I do not know anything about that treatment. Latent fingerprints are caused by the excretion from the sweat glands in the ridges of the fingers. At the same time, these ridges are still there, and when you handle anything a certain amount of moisture accumulates, external as well as internal, which will be there at all times. I do not know of any successful attempt to destroy either the excretions or the sweat glands. But even if this were possible there would be the impression caused by moisture on the outside.

QUESTION: You stated that the government agents were largely young men who had had legal training or accounting training. Why is that when they are to be put on police duty or detective service? Why not take men with police or detective training?

MR. FIERSTONE: That is something that the Attorney General and the Director have decided. Probably it was because our work is investigative and not prosecutive. We investigate crimes and violations of law and that means in the first place that one must be able to recognize what is good evidence, that is, what evidence is admissible in court. The Attorney General and the Director of the Federal Bureau of Investigation have laid down as standards of qualifications that applications will be considered only from persons between the ages of twenty-five and thirty-five, who are graduates of a recognized college, and in addition they are required to have had at least two years of practical experience in either a law office or a public accounting office. Applications will also be accepted from those who have had some years of practical investigating experience.

QUESTION: Then, after judging a man's record in the legal or accounting profession, I understand from what you said, they undergo a very strenuous training for six months—

MR. FIERSTONE: Three months.

QUESTION: Three months. Is it possible that in that short space of time, of three months, they can learn what a detective has spent years to learn, or to acquire the ability to adapt themselves to such radically different conditions?

MR. FIERSTONE: Let me answer your question this way. I can best answer it by quoting from Scripture, "By their fruits ye shall know them". That training includes becoming familiar with the Federal statutes, with what constitutes a violation of them, and with ways and means of detecting the violators. It includes extensive training in fingerprint work, constant training in firearms, constant training in the laboratory becoming acquainted with the work that the experts in the laboratory do, and before they leave the training school, they go out on actual cases with more experienced investigators in the actual investigation of a case.

QUESTION: They must be men of certain physical qualifications?

MR. FIERSTONE: There are no set qualifications that we require, other than to be in good physical condition.

QUESTION: Do they have to go through a very heavy training? They do, as shown in some of the pictures I have seen.

MR. FIERSTONE: I have not seen the picture so I do not know what is in that. The instruction in training school there is limited to those things I have mentioned. They are required to stand a physical examination so that we know they are physically fit for the work they are going into.

MR. LANAHAN: May I say a last word about it. Down at the United States Chamber of Commerce meeting last month Mr. Hoover extended a cordial invitation to all the people that attended the convention, sending a special invitation to a number of us, to see the laboratory and see for ourselves the marvelous things the Government was doing in the detecting of crime. It may be in order to say tonight that we have enjoyed what you have had to say very much, and I am sure that any present who may go to Washington would be made welcome in an inspection of that same laboratory work.

MR. FIERSTONE: Yes. let me say that when you are next in Washington, if you are interested in matters of this sort, go to the new Department of Justice Building and the Director will be very happy to appoint someone to take you through the Bureau and show you the exhibits. We have quite an extensive collection there; we have a Lindbergh and a technical exhibit; and the work in the laboratory you will find very fascinating. Let me extend a cordial invitation to all of you to visit the Bureau's headquarters in Washington.

MR. C. O. DAMBACH: Mr. President and Gentlemen:—The paper we have listened to tonight has been of outstanding interest and I believe the first one of this nature that has been presented before the Railway Club of Pittsburgh since its organization. The number of questions elicited clearly indicates the interest displayed and I believe all our members have enjoyed it as well as myself therefore I move you that we show our appreciation by extending a rising vote of thanks to Mr. Fierstone.

The motion prevailed by unanimous rising vote.

PRESIDENT: As you know, this is the last regular meeting before the summer recess. There will be no more meetings until the regular September meeting. In the proposed amendments to the Constitution and By-Laws that I read to you there There is a provision that the President shall appoint a Nominating Committee. The President is going to make the assumption that at the September meeting the Club will adopt the proposed amendments and therefore I will assume to act in compliance with that provision to the extent of appointing a Nominating Committee early in September, just the same as if the amendments had already been put into effect, and I will ask your unanimous consent to that action.

Now we have prepared for you an entertainment of an unusual character. It has been written, planned and produced entirely by the Police Department. I want to introduce to you Captain John G. Sersch, Superintendent of Police, Pennsylvania Railroad, who will have charge of the entertainment of the evening.

SUPERINTENDENT OF POLICE JOHN G. SERSCH: Mr. President and Gentlemen of The Railway Club of Pittsburgh: Before proceeding with our program, we believe that we owe you gentlemen an apology. We notice that quite a number of you gentlemen seem to be nervous, evidently due to the fact that our efficient police officer so closely scrutinized each member as he entered this room tonight. We do not want you to feel alarmed. However, an explanation, no doubt, is necessary. The officer, while coming through the Pennsylvania Station this evening, sustained an unfortunate and embarrassing loss. Some unscrupulous thief relieved Officer McGonigal of his pocketbook containing his transportation and cash, and he tells me that he hopes to arrest the culprit among the audience present here tonight.

Introduction of characters in mock trial.

A tragedy entitled

"THE BIG HOOK"

written by F. M. Butcher

dramatized and directed by J. G. Sersch,

Superintendent of Police, Pennsylvania R. R.

starring

MELINDA JOHNSON

CAST

JUDGE—Timothy P. O'Toole
F. J. Gauvey, Captain of Police, Pennsylvania Railroad

PROSECUTING ATTORNEY—Dennis McSwat
F. M. Butcher, Captain of Police, Pennsylvania Railroad

COUNSEL FOR DEFENSE—Ignatz Cofulsky
R. Toussaint, Chief of Police, P. & L. E. R. R.

ARRESTING OFFICER—Patrick McGonigal
Albert Zink, Pennsylvania Station

PROSECUTING WITNESS—Lars Larsen
G. J. Morgan, Patrolman, Pennsylvania Railroad

DEFENDANT—Melinda Johnson
H. W. Smith, Sergeant of Police, Pennsylvania Railroad

WITNESS FOR DEFENSE—Julius Slopinsky
J. S. Loudermilk, Clerk, Pennsylvania Railroad

PICKPOCKET—Charles Smith
C. P. Harbaugh, Wreck Master, Union Railroad

SYNOPSIS

The plot depicting the horrors as set forth in this tragedy is laid amidst the environs of Wylie Avenue.

The character in chief, most particularly outstanding in the disruption of the peace and quietude in the locality surrounding her hide-out, is one Melinda Johnson, ably backed up by her gigolo "One Wallop" Slopinsky, who gives gleeful response to her signal for the pig-run of any unfortunate patron who may evince so much as a mild surprise following his discovery that he has been separated from his valuables.

In this particular instance, the victim of assault and robbery is one Lars Larsen, who, as a section boss from McKees Rocks and out for a pay-day jamboree, wanders into Melinda's premises and with great trustfulness seeks her hunch on the winning clearing house numbers for the next day. Following her usual procedure of transferring her guests' valuables a pretext is then sought by Melinda justifying an appeal to her henchman who goes into forcible action by grabbing the victim by the nape of his neck and seat of pants and with maximum acceleration he is lined up for the door and the pig-run is on.

Upon regaining perpendicular status, Larsen, known as the "Big Swede," is confronted by Officer Patrick McGonigal who must pass Melinda's resort in a short-cut to his favorite hangout where they draw them into receptacles tall and broad and without a collar. Strange as it may seem, the brave officer, disregarding his consuming thirst, listened attentively to the wail of Larsen and nobly responding to a sense of duty, enters the house and confronts the erring Melinda with the evidence he has gathered. Her protestations of innocence were met with a loud Irish cackle of unbelief, and without further ado, Melinda's dusky person is subjected to a thorough overhauling by the zealous copper who drew from the innermost recess of her left stocking the plunder she had filched from the overalls of her victim, Lars Larsen.

In consequence of Officer McGonigal's powers of deduction, the last link in this complicated chain of evidence, is forged. Melinda is dragged to jail by the valiant officer who, in a colorful report to his legal advisor Dennis McSwat, insisted that the law take its course.

Melinda hastens to secure the able legal services of one Ignatz Cofulsky, a mouth-piece of shady reputation and tricky disposition. Ignatz, as a business inducement, has circulated the undoubted claim that he has enough on the trial judge, Timothy P. O'Toole, to hang him.

Consequently, as the issue comes to trial, it immediately becomes apparent that this great Commonwealth, in its effort to squelch the activities of such characters as Melinda Johnson, never had a chance.

PRESIDENT: Gentlemen, that this unusual entertainment has been enjoyed by you most highly is, I think, attested by the reception you have given the efforts of Captain Sersch and his company of assistants. In appreciation of their splendid entertainment I would suggest a motion to extend to them a vote of thanks.

ON MOTION a vote of thanks is extended to Captain Sersch and his associates.

PRESIDENT: Is there any further business to come before the meeting? If not, the tables have been prepared at either end of the room, and a motion to adjourn the meeting will be in order.

ON MOTION: Adjourned.

J. D. CONWAY, Secretary.

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In Memoriam

CHARLES FAIR

Joined Club November 22, 1934

Died March 7, 1935

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OF

The Railway Club of Pittsburgh

Organized October 18, 1901

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Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV No. 8. — Pittsburgh, Pa., Sept. 26, 1935 — $1.00 Per Year 25c Per Copy

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PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
*J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

SEPTEMBER 26th, 1935

The meeting was called to order by President R. H. Flinn at 8 o'clock, P. M., at the Fort Pitt Hotel.

Registered attendance, 296, as follows:

MEMBERS

Allen, Earl M.
Ament, F. Chalmer
Anderson, J. G.
Aulbach, A. J.
Babcock F. H.
Baker, George N.
Baker, J. B.
Baker, W. E.
Barr, H. C.
Barr, S. T.
Beam, E. J.
Beatty, Raymond N.
Beeson, H. L.
Beltz, J. D.
Berg, Karl
Bergman, C. R.
Bonhoff, E. L.
Britt, T. E.
Buchanan, C. C.
Buffington, W. P.
Burnette, G. H.
Burel, W. C.
Callahan, D. E.
Callahan, F. J.
Campbell, W. T.
Cannon, T. E.
Carlson, H. E.
Carlson, L. E.
Carr, T. W.
Carroll, D. C.
Cavanaugh, T. J.
Chilcoat, H. E.
Chipley, G. R.
Connelly, J. T.
Conway, J. D.
Cree, W. M.
Crenner, Joseph A.
Cruikshank, J. C
Cunningham, J. D.
Dambach, C. O.
Daugherty, W. A.
Davis, Charles S.
Devine, J. C.
Dickson, K. B.
Dierker, R. H.
Durell, W. A.
Durnell, W. E.
Edwards, Walter
Egbert, J. A.
Ekey, J. S.
Emery, E.
Endsley, Prof. Louis E.
Escott, C. M.
Evans, Charles S.
Evans, Robert E.
Fair, J. M.
Farlow, G. B.
Ferguson R. G.
Fike, James W.
Flinn, R. H.
Forsberg, R. P.
Forsythe, George B.
Fox, M. C.
Fralic, C. F.
Frauenheim, A. M.
Friend, E. F.
Furch, G. J.
Galloway, W. R.
Gardner, George R.
Gardner, K. C.
Geiser, W. P.
Gellatly, William R.
George, R. H.
Gilbert, William J.
Gilg, Henry F.
Gillum, J. S.
Glaser, J. P.
Goda, P. H.
Gray, T. H.
Greek, Joseph
Grieve, Robert E.
Gross, John

Groves, W. C.
Guinnip, M. S.
Haller, Nelson M.
Hamilton, W. H.
Hance, R. H.
Hansen, William C.
Harman, H. H.
Harper, J. T.
Harris, J. P.
Hassler, E. S.
Hayward, C.
Heed, Harmon L.
Hepburn, P. W.
Hilstrom, A. V.
Hofmann, Eugene L.
Holmes, E. H.
Hoopes, R. E.
Hopper, George
Hornefius, S. R.
Huber, H. G.
Huff, A. B.
Hykes, W. H.
Ingman, E. B.
Johnson, Ira S.
Johnson, J. W.
Johnson, Le Vere H.
Kane, H. S.
Keck, L. M.
Kellenberger, K. E.
Kennedy, G. N.
Kentlein, John
Kirk, W. B.
Kiskadden, H. L.
Knoff, R. A.
Kroske, J. F.
Kulp, J. G.
Kusick, Harry F.
Lanning, Edward H.
Larson, W. E.
Layng, F. R.
Lee, L. A.
Leet, C. S.
Loder, C. C.
Logan, J. W., Jr.
Looman, F. W.
Maliphant, C. W.
Mannion, M. F.
Mayer, L. I.
Meinert, H. J.
Meredith, A. R.
Metzger, C. L.
Misner, George W.
Mitchell, W. S.
Moir, W. B.
Molyneaux, Dawes S.
Montague, C. F.
Moore, D. O.
Morgan, Homer C.
Muir, R. Y.
Murray, T. J.
McCormick, E. S.
McGeorge, D. W.
McHail, J. L.
McIntyre, R. C.
McKinley, John T.
McLaughlin, H. B.
McNary, Frank R.
McPherson, A. R.
McTighe, B. J.
McWilliams, J. B.
Nagel, James
Nichols, S. A.
Noble, J. A.
Overholt, B. C.
Paisley, F. R.
Passmore, H. E.
Peters, L. A.
Posteraro, S. F.
Pritchard, Hugh R.
Purchard, Paul
Read, A. A.
Redding, P. E.
Reed, M. R.
Reeser, H. J.
Rief, Joseph
Rodkey, G. C.
Rose, A. J.
Rudd, W. B.
Rutter, H. E.
Ryan, Frank J.
Ryan, J. M.
Satterfield, A. T.
Schadt, A. D.
Schaller, A. J.
Scheline, William A.
Searles, E. J.
Seltman, O. W.
Servais, F. W.
Shackelford, L. P.
Shellenbarger, H. M.
Shepherd, W. B.

Sheridan, T. F.
Shingledecker, J. C.
Schultz, L. W.
Shuster, W. W.
Sipe, D. A.
Sixsmith, G. M.
Slater, A. H.
Smith, G. M.
Smith, Robert B.
Smith, T. R.
Steiner, P. E.
Sterling, C. C.
Stewart, J. C.
Stevenson, W. M.
Stoffregen, Louis E.
Strople, G. H.
Stucki, A.
Sullivan, A. W.
Sutherland, Lloyd
Suter, Albert A.
Swope, B. M.
Tate, M. K.
Ternent, H. J.
Teufel, W. O.
Thomas, H. N.
Thomas, Theodore T.
Thornton, A. W.
Tipton, G. M.
Tracey, J. B. A.
Trax, L. R.
Tomasic, N. M., Jr.
Triem, W. R.
Tucker, John L.
Uhar, John J.
Unger, Dr. J. S.
Van Nort, C. W.
Van Wormer, George M.
Vowinkel, Fred F.
Walter, E. R.
Warfel, John A.
Wark, J. M.
Weaver, W. Frank
Webb, William W.
West, G. S.
Wikander, O. R.
Wildin, G. W.
Wilkinson, W. E.
Williams, O. J.
Wilson, James R.
Wilson W. S.
Wilson W. Stuart, Jr.
Winslow, G. W.
Woodward, R.
Yarnall, Jesse
Zearley, J. P.

VISITORS

Allen, R. C.
Anderson, Harry E.
Arnold, C. C.
Aulbach, Ralph A.
Baker, J. B., Jr.
Bace, James B.
Barber, J. V. H.
Bennett, W. A.
Beyer, Frank C.
Bogovek, Joseph
Boyd, S. S.
Campbell, R. A.
Cashdollar, Ray G.
Collins, J. M.
Cornell, G. M.
Denger, I. M.
Dunham, C. W.
Edwards, C. H.
Elmer, William
Evans, F. E.
Federlein, J. G.
Flowers, H. Fort
Ford, K. L.
Gaffney, Thomas H.
Geamp, Carl
Geisler, Charles N.
Haile, E. C.
Harman, H. H., Jr.
Hess, C. A.
Higginbottom, G. B.
Hilliary, W. R.
Howe, C. H. R.
Hughes, Shelly
Jackson, John S.
Jones, R. E.
Kutylo, A. W.

Lewis, S. B.
Livingston, E. M.
Macfie, W. H.
Martin, William
Mason, T. W.
Mayer, George E.
Meinert, C. J.
Mitchell, F. K.
Monroe, Jack
McCuean, W. C.
McGregor, S. S.
McHenry, D.
McIlroy, J.
Pennoyer, R. P.
Sipe, C. P.
Smith, Sion B.
Snyder, M. P.
Stoernell, John J.
Telcula, L.
Williams, A. G.
Woods, W. E.
Wray, William

PRESIDENT: The first order of business would be the roll call, but that will be dispensed with as you have all signed the registration cards at the door.

Also the reading of the minutes of the last meeting may be dispensed with as you have all received the printed Proceedings some time ago.

We will proceed at once to the announcement of new members. I wish to say that this and the next meeting are the two bargain months of the Club's fiscal year, as those who are accepted in these two months are credited with the payment of dues to the end of October of next year. In accordance with our custom I will ask those who are in the room to stand up when I read their names that you may be recognized by the members and welcomed.

Allen, Earl M., Engineer (Signal), Union Switch & Signal Company, 1318 Lancaster Avenue, Pittsburgh (18), Pa. Recommended by C. M. Wheeler.

Anderson, J. G., Inspector Bridges & Buildings, Pennsylvania Railroad, 623 Market Street, Freeport, Pa. Recommended by G. M. Sixsmith.

Bier, C. D., Salesman, Garlock Packing Company, Maloney Building, Boulevard of Allies, Pittsburgh, Pa. Recommended by Charles J. Nieman.

Connelly, John T., General Foreman, B. & O. R. R. Co., 1705 Hays Street, Swissvale, Pa. Recommended by T. E. Britt.

Cree, W. M., Salesman, Edgewater Steel Company, P. O. Box 478, Pittsburgh, Pa. Recommended by Prof. Louis E. Endsley.

Crissman, L. N., Sales Engineer, Electric Storage Battery Company, 1015 Cochran Road, Mt. Lebanon, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Devine, John C., Assistant Yard Master, Pennsylvania Railroad, 243 South Pacific Avenue, Pittsburgh, Pa. Recommended by Robert E. Grieve.

Durnell, W. E., T. & S., Signalman, Pennsylvania Railroad, 218 Buffalo Street, Freeport, Pa. Recommended by G. M. Sixsmith.

Emerick, J. B., Sales Representative, Garlock Packing Company, 339 Boulevard of Allies, Pittsburgh, Pa. Recommended by E. A. Rauschart.

Fitzsimmons, Edward J., City Manager, City Ice & Fuel Company, 5550 Claybourne Street, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Galloway, Division Trainmaster, B. & O. R. R. Co., B&O Station, Pittsburgh, Pa. Recommended by T. E. Britt.

Geiser, W. P., Superintendent Track, Pennsylvania Railroad, 610 Dick Street, Carnegie, Pa. Recommended by W. E. Baker.

Goss, Richard C., District Sales Manager, Ohio Brass Company, Oliver Building, Pittsburgh, Pa. Recommended by W. B. Moir.

Hance, R. H., Supervising Agent, Division Operator, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Hassler, E. S., Car Foreman, Pennsylvania Railroad, 5526 Beverly Place, Pittsburgh, Pa. Recommended by G. J. Furch.

Heinz, W. T., Manager, Central Railroad Department, Ingersoll-Rand Company, Williamson Building, Cleveland, Ohio. Recommended by J. F. Kroske.

Hoon, F. R., Freight Agent, Pennsylvania Railroad, 1654 Cleveland Avenue, N. W., Canton, Ohio. Recommended by G. M. Sixsmith.

Ingman, E. B., Patrolman, B. & O. R. R. Co., 131 Tipton Street, Pittsburgh, Pa Recommended by T. E. Britt.

Johnston, Samuel, Assistant Comptroller, Gulf Refining Company, Gulf Building, Pittsburgh, Pa. Recommended by Charles J. Nieman.

Kemmerer, R. R., General Engineer, Union Switch & Signal Company, 8012 St. Lawrence Avenue, Swissvale, Pa. Recommended by C. M. Wheeler.

Kennedy, G. N., Foreman, Pennsylvania Railroad, 575 South Negley Avenue—House No. 14, Pittsburgh, Pa. Recommended by W. B. Moir.

Looman, F. W., Freight Agent, Pennsylvania Railroad, Federal Street Station, N. S., Pittsburgh, Pa. Recommended by H. S. Kane.

MacElveny, A. W., General Traffic Manager, Schenley Products Company, 20 West 40th Street, New York, N. Y. Recommended by G. M. Sixsmith.

Miller, Henry, General Manager, Fort Pitt Spring Company, Box 1377, Pittsburgh, Pa. Recommended by D. S. Molyneaux.

McWilliams, J. B., President, Railway Maintenance Corporation, Box 1888, Pittsburgh, Pa. Recommended by R. H. Flinn.

O'Connor, Edward L., Manager, Savon Sales Company, 4746 Mossfield Street, Pittsburgh, Pa. Recommended by G. M. Van Wormer.

Peters, L. A., Train Rider, B. & O. R. R. Co., 4829 Liberty Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Reeser, Harvey J., Examiner, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by Roger Sarchet.

Rupp, Edwin S., Assistant Division Accountant, B. & O. R. R. Co., 228 Lelia Street, Pittsburgh, Pa. (11). Recomended by T. E. Britt.

Smith, Robert B., Transportation Sales, Westinghouse Electric & Manufacturing Company, 409 Rebecca Street, Wilkinsburg, Pa. Recommended by J. D. Conway.

Steiner, P. E., Maintainer T. & S., Pennsylvania Railroad, 117 Washington Street, Freeport, Pa. Recommended by G. M. Sixsmith.

Stewart, J. C., Freight Agent, Pennsylvania Railroad, Eleventh Street Station, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

Strople, George H., Track Supervisor, B. & O. R. R. Co., Callery, Pa. Recommended by T. E. Britt.

Sullivan, Robert J., Examiner, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by Roger Sarchet.

Sutter, A. A., Lieutenant of Police, B. & O. R. R. Co., 2044 Redrose Avenue, Carrick, Pittsburgh, Pa. Recommended by T. E. Britt.

Van Wormer, George M, Salesman, Savon Sales Company, 129 Clairhaven Street, Crafton Heights, Pittsburgh, Pa. Recommended by J. D. Conway.

Wallace, H. A. Engineer, Union Switch & Signal Company, Swissvale, Pa. Recommended by C. M. Wheeler.

Wilson, W. Stuart, Rate Clerk, Pennsylvania Railroad, 725 Florence Avenue, Avalon, Pittsburgh, Pa. Recommended by G. M. Sixsmith.

PRESIDENT: We have lost our Chairman of the Membership Committee, Mr. Herbert J. Watt. He is no longer participating actively in the affairs of the Club because he was transferred to New York as Manager of the New York Sales Office of Jones and Laughlin Steel Corp'n., a very fine and well deserved promotion. He has done a most magnificent job as Chairman of the Membership Committee. As a result of his leaving we had to appoint a temporary Chairman to act until the election, which will be next meeting. So I called Mr. Sixsmith to take over the work of that Committee and especially to try to clean up the members whose dues were delinquent. I know they have made good progress along that line and I would like to have Mr. Sixsmith give a report of the work of the Committee at this time.

MR. G. M. SIXSMITH: Mr. President and Members of the Railway Club of Pittsburgh: Let me say first that I regard my connection with the Membership Committee merely in the capacity of a pinch-hitter for Herbert Watt. As Mr. Flinn has said, Mr. Watt was called to New York from Pittsburgh before he could complete the work of the Membership Committee for this fiscal year which he had so ably started, and since taking his place on the Committee, it has been necessary only for me to carry on where he left off, and with the co-operation of the other members of the Committee, this was not a difficult task.

Your Membership Committee has been quite active during the past few weeks. As of August 1st, we were carrying in our records a total of 1,121 members. Of that number, 98 were delinquent. As you have been told, the Membership Committee was given the job of bringing our membership as nearly up-to-date as possible. To accomplish this, we had no intention of inaugurating a dunning campaign, or with the thought of embarrasing any person, but rather to make an honest effort to develop the attitude of the delinquent members. If they were desirous of continuing their membership in this organization, we were naturally anxious to get them in good standing, but if for any reason they desired to resign, it was well that we know of this attitude in order that our records and membership could be adjusted accordingly.

Of the 98 delinquents as of August 1st, nine were new members who came in during the current year and who had not paid any dues at all.

During the past few weeks, the Membership Committee has contacted practically all of these delinquents in one way or another, with the following result up to the present moment: 31 have paid their dues, 11 additional promised to pay within the next few days, 35 we have not heard from—but I am confident we will hear from at least some of these shortly, 2 resigned, 1 died, and 2 we have not located.

I am sorry that I was not able to prepare a formal written report, but this is due to the fact that the last meeting of the Membership Committee to develop the results obtained by the individual members was held only a few minutes ago, and I am asking you, Mr. President and Members of the Club, to accept this extemporaneous report as a progress report only, and we hope to be prepared at the October Meeting to make a final report of the result of the efforts of the Membership Committee to develop the attitude of all our existing delinquent members, in order that we may have our records complete at that time.

PRESIDENT: That is fine. We will look for a further report at the Annual Meeting.

Mr. Secretary, are there any announcements?

SECRETARY: Since our May meeting we have lost quite a number of prominent members of this Club.

Gen. W. W. Atterbury, Retired President, Pennsylvania Railroad, died September 20, 1935.

Maurice L. Burgham, Sales Department, Edgewater Steel Co., died July 19, 1935.

J. G. Code, Vice President and General Manager, Jefferson Southwestern R. R., died July 6, 1935.

O. F. Goodman, Sales Engineer, Worthington Pump and Machinery Corp., died May 1, 1935.

S. R. Henry, Supervisor, Pennsylvania Railroad, died August 17, 1935.

Bert Hyanes, Mechanical Representative, New York Air Brake Co., died August 9, 1935.

Harry W. Lehr, General Foreman, Pennsylvania Railroad, died August 15, 1935.

Walter H. Myers, Chief Clerk, Montour Railroad, died March 28, 1935.

J. P. McIlwain, Freight Agent, P. & L. E. R. R., died July 17, 1935.

Mr. Code was the oldest living Past President of this Club. And it may not be known to all of you that General Atterbury was one of the Charter Members of this Club and he maintained his connection with the Club continuously ever since.

PRESIDENT: An appropriate memorial will appear in the next issue of the Proceedings. As Mr. Conway has said, Mr. Code was the oldest living Past President of the Club and his son is a member of our Club, being Division Engineer on the Pan Handle Division of P. R. R.

The next order of business is Unfinished Business, and we have a little unfinished business, as you will recall that certain amendments to the Constitution and By-Laws were presented at the May meeting in accordance with Article 7, and these proposed amendments were, on Motion of the Chairman of the Executive Committe, printed in the May Proceedings, in parallel column with the present provisions which they are intended to amend, so the Members would have ample opportunity to see just what is proposed in the way of amendments and in order that they might be properly brought before this meeting for action.

I do not know that there is necessity for any particular discussion, for it was explained at that time that the reason for the amendments was largely to legalize changes that the Executive Committee had made from time to time, with your authority, and bring the Constitution and By-Laws of the Club up to date. Of course it is perfectly proper to ask any questions or make any comments you may wish. The amendments are now before you for action.

ON MOTION of Professor Endsley, duly seconded and carried by unanimous vote, the amendments as printed in the May, 1935, Proceedings are adpoted.

PRESIDENT: You will remember that I said at the May meeting that I would anticipate the adoption of these amendments and appoint a Nominating Committee. In order to refresh your recollection I will read that particular Article.

ARTICLE VI

ELECTION OF OFFICERS

SECTION 2. The President will appoint a Nominating Committee of five members, three of whom must be regularly elected members of the Executive Committee, who shall at the September meeting recommend nominations for all offices to be filled at the annual meeting and these, together with any other nominations which may be made from the floor under proper procedure, will be printed and mailed as a letter ballot to all of the members of the Club, not less than twenty days previous to the Annual Meeting, by the elective members of the Executive Committee. Each member may express his choice for the several offices to be filled by properly marking the letter-ballot and returning it to the Chairman of the Executive Committee.

Acting on the assumption that the amendment would be adopted, I appointed a Nominating Committee, consisting of Mr. C. O. Dambach, Mr. A. Stucki, Mr. L. E. Endsley, Mr. H E. Passmore and Mr. G. H. Burnette, and I will now ask Mr. Dambach as Chairman of that Committee to make his report.

Perhaps I should make just a word of explanation before he makes his report, to relieve the Committee from possible embarrassment. Mr. C. M. Yohe was elected First Vice President of the Club last year and it was expected that he would be elected to serve as President during the coming year. In conversation with him it developed that he felt that he could not devote the time necessary to the office and he asked that his name be withdrawn. With that explanation I will ask Mr. Dambach to present his report.

MR. C. O. DAMBACH: Your Committee was very much disappointed to learn that Mr. Yohe could not preside over the affairs of the Club during the ensuing year. The Committee felt that since this action was entirely his, he was entitled to the honor and consideration of having the place filled from the personnel of his own organization, and consequently we have offered as the nominee for President Mr. R. P. Forsberg, Chief Engineer of the Pittsburgh and Lake Erie Railroad.

Report of Nominating Committee:

For President—R. P. Forsberg.

For First Vice President—E. A. Rauschart.

For Second Vice President—G. M. Sixsmith.

For Secretary—J. D. Conway.

For Treasurer—E. J. Searles.

Executive Committee (Eleven to Elect)—Frank J. Lanahan, A. Stucki, Samuel Lynn, D. F. Crawford, G. W. Wildin, W. S. McAbee, E. W. Smith, Louis E. Endsley, F. I. Snyder, C. O. Dambach, R. H. Flinn.

Subject Committee (Two to Elect)—D. W. McGeorge, 3 years; M. R. Reed, 3 years.

Reception and Attendance Committee (Nine to Elect)—J. D. Beltz, 3 years; J. W. Hoover, 3 years; J. W. Johnson, 3 years; A. A. Read, 3 years; C. P. Schrecongost, 3 years; J. C. Shingledecker, 2 years; J. C. Dilworth, 2 years; G. H. Burnette, 2 years; W. R. Triem, 2 years.

Entertainment Committee (Five to Elect)—J. Porter Gillespie, 3 years; Frank E. Weis, 2 years; James Nagel, 3 years; A. L. Kessler, 2 years; T. F. Sheridan, 2 years.

Membership Committee (Nine to Elect)—William R. Gellatly, 3 years; Thomas R. Fitzpatrick, 3 years; P. W. Hepburn, 3 years; W. B. Moir, 3 years; C. W. Trust, 3 years; C.

M. Wheeler, 2 years; A. C. Pollock, 2 years; W. F. Ambrose, 2 years, John I. Mulvey, 2 years.

Finance Committee (Three to Elect—F. J. Ryan, 3 years; C. E. Catt, 3 years; J. W. Boyd, 3 years.

Advertising Committee (Three to Elect)—E. A. Foard, 3 years; Karl Berg, 2 years; H. E. Passmore, 2 years.

C. O. DAMBACH, Chairman,
LOUIS E. ENDSLEY,
A. STUCKI,
G. H. BURNETTE,
H. E. PASSMORE,
Nominating Committee.

PRESIDENT: You will understand that members of some of the Committees are elected for a term of more than one year, and consequently there are now members of those Committees who hold over, and the full membership of these Committees is made up of these holdovers together with those who are to be elected at the Annual Meeting.

Are there any further nominations? You will understand that any member has the right to make nominations for any office. If there are no further nominations I would suggest a motion that nominations be closed.

ON MOTION nominations are closed.

PRESIDENT: I want to take this opportunity to say to the Nominating Committee and to you all that these men whom you have placed in nomination are a very fine and capable set of officers who will carry on the work of the Club in a very fine way, and you are to be congratulated on the selections that have been placed before you tonight.

Is there any other business? If not, we come to the presentation of the paper of the evening. I had a very pleasant visit today with the speaker and I am quite sure you will hear a very interesting paper and discussion. I may say from what contact I have had with Mr. Howe that he knows his subject. I hope there will be some of you who have questions to ask him, and I am sure he will be glad to answer them and explain anything that may not be entirely clear to you. The subject of the paper is "The Use of Motion Pictures in the Promotion of Standard Practices in Handling Track Work and Roadway Equipment" and the paper will be presented by Mr. C. H. R. Howe, Cost Engineer, Chesapeake &

Ohio Lines, Richmond, Virginia, and it is a privelege and a pleasure to present to you Mr. Howe.

THE USE OF MOTION PICTURES IN THE PROMOTION OF STANDARD PRACTICES IN HANDLING TRACK WORK AND ROADWAY EQUIPMENT

By C. H. R. HOWE, Cost Engineer,
Chesapeake & Ohio Lines, Richmond, Virginia.

Whether a railway is being operated profitably or at a loss, we are always confronted with the necessity for finding ways and means through which to conserve labor and material. The method employed in the solution of any particular problem is, of course, largely dependent upon the nature of the work in question.

We are all familiar with the motion picture as a source of public entertainment, also with many of the applications for commercial and industrial purposes. This evening I hope to illustrate some of the advantages to be gained through the use of the motion picture as an aid in the solution of some of our railroad maintenance problems.

The pictures are largely self-explanatory and require but little comment, however, a brief outline of certain methods of their application to our use may be of interest.

The past few years have witnessed radical changes in handling maintenance operations. The introduction of gas and electric powered machinery has simplified many of our major problems, but paradoxically this has greatly complicated the supervisory officer's job. As an illustration, planning the work and scheduling the moves of a rail gang of two hundred men, so as to minimize lost time and also avoid interference with traffic, is not a simple proposition.

When we consider that the equipment of such a gang, fully mechanized, represents an investment of forty to fifty thousand dollars, we realize that we have quite a sizeable plant on our hands. Indeed there is a marked similarity between this organization and the typical small industrial manufacturing plant. The difference being that raw material is brought to the factory and progresses along a definite route of fixed machines, each of which performs its quota of the general process of production. We on the other hand must move our rail laying plant to the site of operation, deliver our own raw material, pass our machines over the work, leave the finished product in place, and move our plant to the next job.

In most lines of manufacture competition is keen and if the owner, or manager, desires to remain in business, he must see to it that his methods are efficient; to accomplish this, the routine of manufacture must move on at an even pace without interruption. The layout of machines, and the number of each must be such that each contributes its quota at its scheduled time and place. That is exactly the result that we desire in a track gang.

If we were to establish ten industrial plants, each to manufacture the same product, with each manager free to follow his own ideas, undoubtedly at first there would be ten different layouts and the routines would vary. Eventually through experience there would develop a similarity of layout and routine and the ten plants would function in pretty much the same way. But during this evolution some of the experiments made would be costly, time and money wasted, and superfluous or inadequate machinery purchased. This seems to me to be exactly our situation with reference to some of our track gang operations.

Fortunately for us the introduction of machinery in our track work has been gradual, and we have been able to adjust our organizations to meet the requirements of the new equipment. That, however, is but one phase of the question. We are still confronted with the problem of reconciling the varying ideas of the individual foremen as to how to handle work.

Now I believe that if we can consolidate all of the best practices developed in various gangs, we shall have gone far toward what may be termed standardization of practice.

In applying this principle to the development of standardization the motion picture can be of great assistance. While examples of good practice in individual cases may be readily apparent in various operations and in different gangs, the co-ordination of these practices requires something more than temporary observation. Unfortunately the brain is limited in its capacity to grasp the details of very many concurrent actions and place a value on their relations. Nor does the impression of what was observed remain intact in the mind. To place relative values on the details of action it is customary to resort to time studies. Here again the incapacity of the brain is shown, for the eye must concentrate on a series of consecutive actions, and concurrent actions pass unnoted. The camera is without these defects, for everything that appears within its scope is seen and permanently recorded, concurrent action included.

The advantage of the permanent record is that it may be reviewed and studied as many times as necessary, not only by a single observer but by any number of judges versed in the paticular work involved. Thus defects in the details may be detected and corrected. Also time studies may be made of concurrent operations and the results co-ordinated.

In the practical application of this method it is natural to study individual operations, then to select the most promising organization for standardization. When this has been accomplished, complete pictures are taken of the gang at work. These pictures with suitable captions are shown to the men in charge of other gangs for their information and study. When properly followed up the result of this procedure is uniformity of practice.

I believe that, when the methods outlined are pursued, the results obtained in expediting standardization and eliminating wasteful experiments, will more than justify the slight expense incurred.

MR. HOWE: Those of us who have had direct connection with laying rail know that conditions for laying vary not only on different parts of a railway, but also vary from day to day even on the same track. While the local officers and their subordinates are in the best position to understand local requirements they must also accept responsibility for results obtained. However, it is asking too much of a general foreman, in charge of one of these large mechanized gangs, to make spot decisions as to the line-up of his men and machinery, and not experience considerable lost motion. In order to minimize such losses we have found that it is helpful to provide our men with information indicating what results are probable under a given condition.

This information is shown graphically on the chart before you, and I am going to ask Mr. George M. Cornell, Assistant Cost Engineer, of the Chesapeake and Ohio, to explain the diagrams.

RECENT DEVELOPMENT IN DITCHER TRAIN OPERATIONS

The problems of embankment raising and cut widening, without interfering with traffic, have always been of concern to railway officers. Where the work is side hill excavation, or in short through cuts, where the distance to the dumping ground is not far, there are numerous economical methods of handling the job. The long cuts where the distance to the dumping place may be several miles are a different proposition, for the excavated material must be loaded into, and dumped from, cars operating on a main track; consequently the work is subject to interruptions from traffic.

The actual excavation is accomplished by small steam (or other power) shovels mounted on the train which is being loaded, for, unless the cutting is to be of such a width as to provide room for additional trackage, it would not be economical to work the shovel on the ground, for too much material would be excavated.

The idea of mounting the shovel on the work train itself

was conceived about thirty years ago by the American Hoist and Derrick Company, who built a small shovel mounted on double pairs of spool wheels, which ran on overlapping sections of skeleton track which were transferable from car to car. The original method of operation was to make up a train of several flat cars over which the shovel, or ditcher, moved loading each in turn. When the loading was complete the train ran to the dump and the unloading was accomplished by fastening one end of a cable to the locomotive and attaching the other end to a plow that was mounted on the top of a flat car at the other end of the train. The engine was then cut off from the train and moved ahead pulling the plow over the string of flat cars. The cars had to be anchored to the track which was hard on the ties, rail and track fittings, so this method was soon discarded in favor of a steam operated drum, which was mounted on a car at the opposite end of the train from the plow. This drum as it wound up the cable drew the plow along the train.

Due to numerous reasons, perhaps the most important of which was the small amount of dirt that could be loaded on each car, about 16 to 20 cubic yards, this method gradually became obsolete and the present conventional type of operation came into favor.

This method consists in mounting the ditcher on a flat car placed between two side dump cars. As the capacity of these cars is limited to the dumping radius, or reach, of the

ditcher, not over 16 to 20 cubic yards can be loaded in each car. As the loading is confined to two cars it will be seen that after loading 40 cubic yards per ditcher, a run to the dumping ground must be made. The average loading of a single ditcher may be from 280 to 300 cubic yards per day, from which it is evident that seven dump runs, at least, must be made. Operating two or more ditchers together will reduce the time to finish a given job and also reduce the number of work trains required, it also reduces the number of dump runs.

As previously stated the limited dumping radius of the mounted type ditcher prevented the railways from taking advantage of the improvements that have been taking place in the character of dump cars used in construction service. On construction, the cuts being more extensive, the shovels are worked on the ground loading the material excavated into cars drawn past on an adjacent track. Economy in car construction dictated the use of longer cars which were then provided. As these cars were much more heavily loaded their handling in dumping was more difficult than with the lighter type, the bodies of which were hinged along their center line and were dumped by tilting to one side or the other of the track. The tilting and relevelling the car bodies being accomplished by compressed air from the engine pumps, it was natural that as the weights of car bodies and loads increased, the size of air cylinders and pistons, that dumped the loads, should also be increased.

The use of compressed air as a source of dumping power eventually led to the invention of a more stable and substantial type of dump car, that which is known as the trunnion type. These cars vary considerably in design from the earlier pedestal type center hinged cars, the principal points of difference being that the car does not rotate about its center line, but about a line parallel to and near the outer edge of the car body. As the body is not directly attached to the center sill of the car but moves independently of it, the dumping operation is performed by elevating one side of the car with the pistons of the vertical air cylinders beneath. As there are two of these cylinders on either side of the car it may be dumped in either direction. When in level riding position the weight of body and load are carried directly by the center sill, and stabilization is accomplished by means of side bearing pedestals mounted on the trucks as in any ordinary car. When the car is in the process of dumping the sides, which are hinged at their lower edges, fold outward forming aprons which permit dumping the load much further from the track than with center hinged pedestal type car.

Notwithstanding the improvements in design and construction that had taken place in dump car building, the objection still remained of limited loading capacity, and excess running time to dumps, in railroad ditching service.

A study of time lost by the Chesapeake and Ohio ditchers in running to the points of dumping with loads averaging 40 cu. yd. showed that, under average conditions, five trips a day were made to the dump, with a loss in ditcher time


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equivalent to $26.33 a day per ditcher. With 14 ditchers working approximately 200 days a year on the road this indicated a possible loss of efficiency of about $73,724.00 a year.

This analysis led to the development of drop-end side-dump cars, and crawler-mounted ditchers. With this equipment the number of cars in the ditching train can be extended up to the daily loading capacity of the ditcher. Thus, with sufficient car capacity available, runs to the dump can be limited to one a day if found desirable, making possible the most intensive use of the ditcher.

Co-operating with the railroad, several car manufacturers have developed drop-end designs for their standard side-dump cars, which thus permit the movement of crawler-mounted ditchers through the cars. These designs vary in minor details, but are fundamentally the same. Essentially, the cars are the standard 30-yard, side-hinged or trunnion-type models of the companies, except for the drop-end feature and some special reinforcing of the floor and floor supports to carry the concentrated working load of the ditcher. The drop end doors are hinged in each case and are strongly reinforced to support the weight of the ditcher as it moves from car to car.

In the types developed, the drop ends can be air-operated or not. Where air operation of the end doors is provided, the end door cylinders are so interlocked in the car-dumping air line that the car cannot be tilted when the end doors are down. Where the end doors are not air-operated, it is intended that they shall be raised and lowered by a quickly-applied chain or cable hitch to the bucket of the ditcher, or directly by the bucket itself. With this type of door operation, protection against the tilting of the car while it is occupied by a ditcher is provided by so locating the side dumping control valves at the ends of the cars that they cannot possibly be reached and operated while the end doors are down. The only other special features of the drop ends generally are that they have been provided with angle guides on their inner faces to direct the treads of the ditcher in moving on or off the car, and that some of the doors have mitered ends in conjunction with miters on the ends of the drop sides.

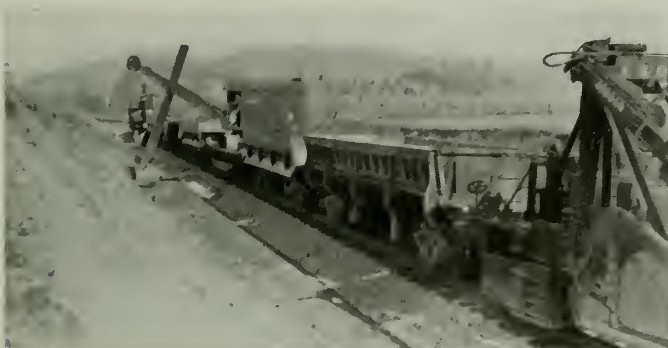
Owing to the sturdy construction of the cars, as reinforced for carrying a ditcher, and the fact that the weight of the dumping mechanism is concentrated below the floor level, these cars have a low center of gravity, which, combined with the wide spread of the side trunnions, gives them great stability.

A general description of the new ditcher train may well start with the main motive power, a Mikado type locomotive. This comparatively heavy engine is required in order to furnish sufficient tractive force to spread the material dropped from the dump cars out onto the shoulder of the roadbed. An extra air pump has been mounted on the engine to supply air for operating the dumping mechanism of the dump cars and this air supply is carried through the train in a piping

system distinct from that used for operating the train brakes thus avoiding the setting of the brakes and the subsequent delay for pumping up the train line reservoirs each time the cars are dumped.

Immediately ahead of the engine is a Jordan Spreader. This piece of equipment is essentially a specially designed flat car provided at each side with a large steel wing which can be swung out horizontally and raised or lowered vertically by means of air operated levers. After the earth has been dumped from the dump cars onto the roadbed along the track the wing on the side of the Jordan Spreader on which the earth has been dropped is moved out and down to the level at which it is desired to cut the top of the roadbed shoulder. The locomotive then slowly pushes the spreader forward and the outstretched wing plows all the excess earth outward over the roadbed shoulder.

The dump cars are arranged in two sets and are placed in the train ahead of the Jordan Spreader. Each set consists of a flat car in the center for carrying the shovel, a drop end dump car at each end of the flat, and a solid end dump car at each end of the set. The flat car is provided with steel runways down each side which guide the two crawler treads of the shovel. In filling the train the ends of the drop end dump cars are lowered and the shovel is run up into one end of one of these cars. From this position the shovel is able to



fill one of the solid end cars. The end door of the drop nd car adjacent to the solid end car is then raised and the shovel fills up the drop end car, backing off towards the flat car as filling progresses. When the shovel has backed off onto the flat car the end door adjacent to the flat car is raised and the filling of the drop end dump car is completed. The shovel then moves to the other end of the flat and into the second drop end car to repeat the operating cycle and fill one solid end and one drop end car. When the train is to be moved to the point where the earth is to be dumped the shovel is placed on the flat car. With two shovels and four drop end cars eight cars can be filled with earth for each trip to the dumping point. Of course, with more drop end cars the length of the train could be extended indefinitely but the time during which the track can be occupied sets a limit to the number of cars that can be filled at one time.

The spreader and dump cars are placed ahead of the locomotive so that the engineer can easily watch the operations for moving signals. Behind the engine are the living quarters for the ditcher force consisting of a combination foreman-cook car and a bunk car. This equipment is kept in the train to avoid the necessity of running to a lay-up point for lunch.

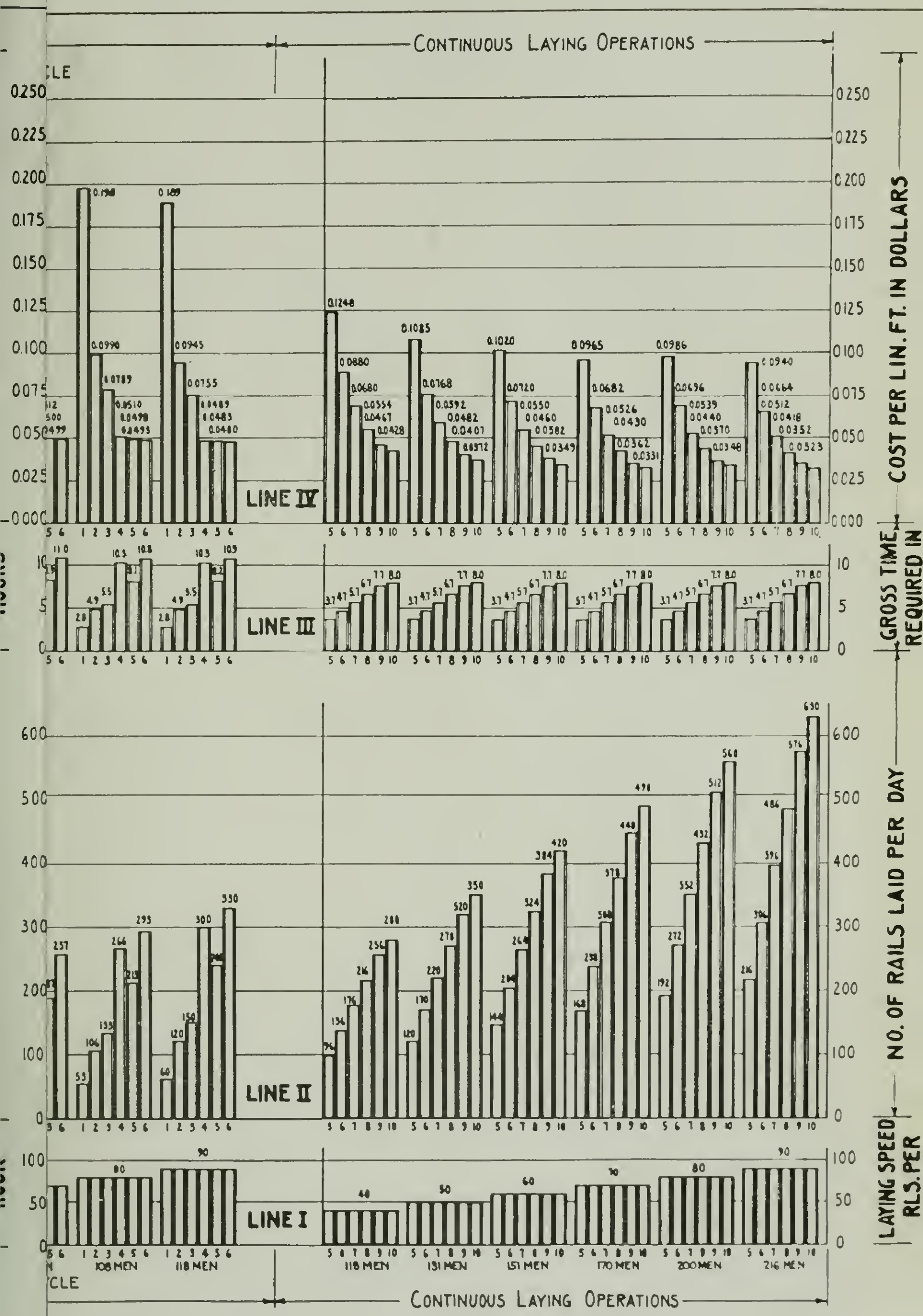
The shovels are three-quarter yard gasoline driven machines and use about thirty gallons of fuel per day. Heretofore the gasoline has been handled in fifty gallon drums, but in the near future it is planned to furnish the force a 4,000 gallon capacity car. This new car will be equipped with an air operated pump to force the fuel from the tanks in the car to the tanks on the shovel thereby eliminating the handling of heavy drums and the filling of the shovels with small gasoline cans.

The success achieved by this train indicates that as the older type ditchers and dump cars are retired, they will be replaced by the new equipment described in this article.

EXPLANATION OF CHART NO. 1
RAIL LAYING ORGANIZATION

MR. GEORGE M. CORNELL: The various colors and their corresponding numbers on the chart indicate different traffic conditions which limit the securing of the track for rail laying. Then different conditions are assured and they range from a traffic situation which would allow the track to be out of service for only one hour per day to an arrangement, such as double or multiple track layout, which would permit one of the tracks to be taken out of service for eight continuous hours.

The chart is divided into two main divisions, namely, cyclical and continuous laying with the first main division, further sub-divided into two cycle and one cycle laying. By cyclical laying is meant an organization of the work of rail laying such that only a portion of the complete set of operations is done at one time. In one cycle laying all the work from pulling spikes to driving new spikes, in other words, all the work necessary to be done to pass trains over the track, is carried out as a continuous operation but such work as distributing small track material, hanging angle bars, assembling scrap, etc., is carried out either before or after the main laying cycle. Two cycle laying differs from one cycle only in that the main laying operation is divided into two parts. The gang does all the work from pulling spikes to setting in the new rail as one continued operation and then goes back over the track and completes the work from bolting the new rail to spiking the new rail.



Organization.

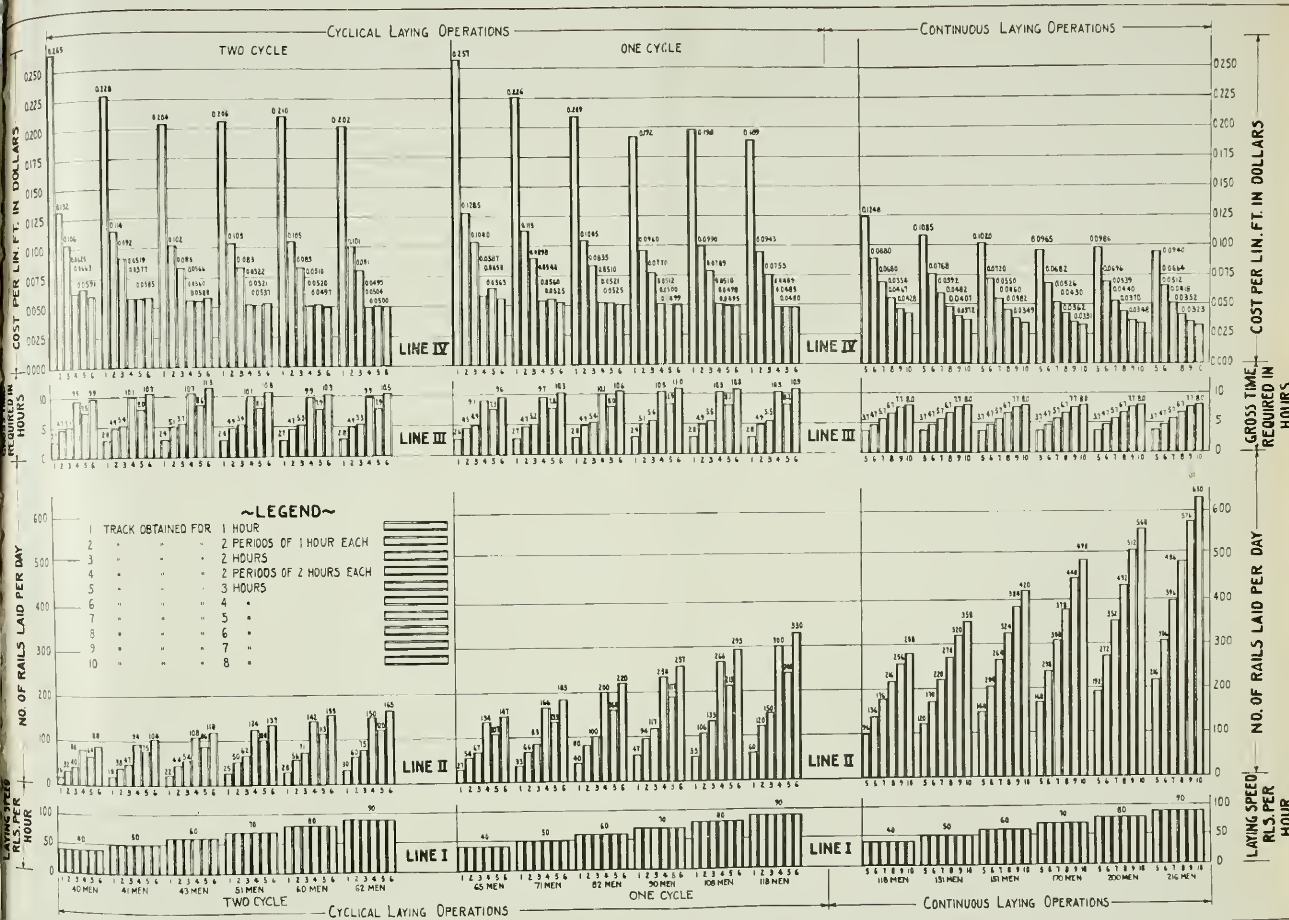


Chart No. 1, Rail Laying Organization.

By continuous laying is meant an organization of the work such that all operations, from distributing small track material to assembling scrap, are carried out as a unit. It is apparent that the largest gangs will work under continuous laying conditions, medium size gangs will operate under one cycle conditions, and the smallest sizes of forces will handle the work with two cycle laying operations.

On Line I of the chart is shown the laying speed of the various size gangs in rails per hour, the variation being from 40 to 90 rails per hour by steps of ten rails per hour. This laying speed is the number of rails (39 feet long) actually set in place per hour by the rail laying crane during the time it is actually engaged in laying rail. No factors of lost time are considered on this line.

On Line II is shown the number of rails that can be laid per day. The calculations for this line include consideration of the time lost going to and from work, opening and closing track, etc.

Line III shows the gross time in hours that will be consumed by the force in laying the number of rails shown in Line II. The time includes that necessary for going to and from work, train delays, opening and closing track, etc.

Line IV indicates the cost in dollars per lineal foot of rail. The cost per foot of track will, of course, be double the amount shown in Line IV.

As an example of the use of the chart assume a location where the track can be secured for only three hours per day. Also assume a laying speed of 70 rails per hour. With two cycle operations this laying speed will require 51 laborers, 100 rails will be laid per day, the gross time consumed will be 8.1 hours, and the cost will be $0.0521 per foot of rail. Under one cycle laying operations 90 laborers will be necessary, 187 rails will be laid per day, 8.3 hours will be required, and the cost will be $0.0500 per foot of rail. If a continuous laying organization is used 170 men will be required, 168 rails will be laid per day, 3.7 hours will be used, and the unit cost will be $0.0965 per foot of rail.

With the use of this chart the relationship between gang size and organization, laying speed, and traffic conditions at the point of laying can be readily studied and the most economical set-up can be quickly estimated.

MR. HOWE: You will have noted on the rail gang film just shown that a considerable variety of power machines and tools were in use. This equipment is being improved continually and new applicances are being developed. It is not always convenient for railway officers to take the time to witness demonstrations of new machines on their own, on other railways or at the manufacturers plant. It is still more out of question to send any very large numbers of interested employees to witness such events. It is, however, a simple and inexpensive matter to send one man with a motion picture camera to record what takes place. Later the film can be reviewed and studied at leisure by all interested. An illustration of this use of the camera will now be shown in connection with some recent developments in railway ditching operations.

A number of moving pictures showing operations in ditching was then shown.

PRESIDENT: I am sure we have listened to a very interesting presentation of a very interesting subject, and I am quite certain there are some questions you would like to ask. As I have said often before, I will not stand up here and try to drag people to their feet. I have spoken to two or three asking them to comment on the paper, and I will ask the floor for them now. Mr. Layng was in the room a while ago. Will he make any comments?

MR. FRANK R. LAYNG: I did not want to be the first to start the discussion. This has been a very interesting paper. I have no particular comment to make but there are some questions I would like to ask Mr. Howe. I gathered that the practice is to lay one rail a considerable distance and then drop back and lay the other.

MR. HOWE: What we recommend is to use a second gang to lay the second rail behind the first gang, but when we are unable to do this we do drop back and lay the other rail.

MR. LAYNG: You mean to have a second gang following on the opposite rail?

MR. HOWE: Yes, one laying the first rail and then following them, a second gang laying the rail opposite.

MR. LAYNG: While you are laying rail you put the track out of service during that period?

MR. HOWE: Quite frequently we can do that on multiple track installation. A good deal of our track is double track.

MR. LAYNG: On single track?

MR. HOWE: We have to take our chances.

MR. LAYNG: Do you use this equipment very much on single track?

MR. HOWE: We do not find it as desirable.

MR. LAYNG: You also have single track problems?

MR. HOWE: We find there is so much time spent running to get in the clear that we lose too much time using heavy machines.

MR. LAYNG: One other question, that is the process of gas heat treatment.

MR. HOWE: Yes sir.

MR. LAYNG: Do you find that as satisfactory as other means that have been used?

MR. HOWE: I do not want to make any invidious comparisons. You can get good results either way. We have seven hundred miles of new rail gas heat-treated before traffic was allowed over it, and thirteen hundred miles of rebuilt rail ends that have been heat-treated. We also have some electrically heat-treated. I don't recall just the mileage.

MR. LAYNG: I would like to ask whether or not they grind the rail end before they heat-treat it? I did not see anything in the illustrations on that.

MR. HOWE: In the first operation you saw, that of denutting the joint there was a third man with a hand grinder, but you do not get as good a job as with a precision grinder.

MR. LAYNG: With your precision grinder is it your practice to grind them as the rail is laid or soon after?

MR. HOWE: Our practice is that no traffic is allowed over the new rail until it is heat-treated and ground.

MR. LAYNG: Mr. Emery, who is sitting beside me, is not an expert on these matters of ditching and grading that have been illustrated but he knows all about the mechanical problems, and he made an observation that will bear thought as to why they do not finish their railroads when they build them instead of digging them out as they go along later.

MR. HOWE: With nearly all railroads built as competitive projects, the idea was to get the track laid quickly and then to come back and finish them afterwards.

MR. LAYNG: But you would not say that it would not pay to have wide cuts and good grading.

MR. HOWE: Mr. Flinn and I were discussing this matter this morning and he remarked that location engineers seventy-five or eighty years ago knew as well as we do that for every dollar you spend for building track you can afford to spend a dollar for drainage. This is also Mr. Flinn's idea and it seems good business to me.

MR. LAYNG: Mr. Charles Latimer used to say that a foot of ditch is worth a foot of ballast.

MR. HOWE: I quite agree, a foot of good ditch gives in effect a foot of sub-ballast.

PRESIDENT: Is there any other discussion?

MR. R. P. FORSBERG: What particular use do you make of your pictures with your section men?

MR. HOWE: Not so much with the section men and their activities, but when we are holding foremen's meetings the pictures are shown for general educational reasons. Most of our pictures are in connection with large gang or other major operations. Our supervisors and foremen are brought to division headquarters, where we show them our standard practice pictures. It is sometimes hard to get people on different parts of the railroad to agree to do the same thing the same way, but if we show a picture of the proper method they will get it, and if you notice later you probably will find them doing it pretty much alike.

PRESIDENT: Does any one else care to say anything? We will not prolong the discussion unless some one has something he wishes to say. The next meeting, in October, is the Annual Meeting and Election of Officers and we will have a big turn out and a lot of fun. You will get the announcement in due time.

If there is no further business to come before the meeting I will ask Mr. Dambach to close the discussion.

MR. C. O. DAMBACH: Mr. President and Gentlemen: I am sure we have all enjoyed not only the paper this evening but also the interesting manner in which it was illustrated Mr. Howe has shown us a new way of taking care of a very troublesome condition on a railroad and since he is apparently doing the job for less money than many if not all of us are at the present time, I think he and the railroad he represents are to be highly commended for their pioneering. I know we have all enjoyed his clear presentation of this very interesting subject therefore I would move a rising vote of thanks as an expression of our appreciation.

PRESIDENT: Mr. Howe, please accept the thanks of the Club. Luncheon is ready at both ends of the room and the meeting will now stand adjourned.

J. D. CONWAY, Secretary.

SCRIBBLITZ

Hope you all enjoyed the Summer vacation.

* * * * *

Now lets apply that stored energy in the interest of the Club.

* * * * *

Keep your weather eye cocked for any not enrolled as a member.

* * * * *

Get him by any method, fair or foul, he'll like it.

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* * * * *

While we're in that "likeable" mood, one other essential matter we just have to mention:

* * * * *

Look at your membership card—if the year looks "ancient", have it "rejuvinated" at once.

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Vol. XXXIV. OCTOBER 24, 1935 No. 9

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LIST OF MEMBERS

OFFICIAL PROCEEDINGS

OF

The Railway Club of Pittsburgh

Organized October 18, 1901

Published monthly, except June, July and August, by the Railway Club of Pittsburgh, J. D. Conway, Secretary, 515 Grandview Ave., Pittsburgh, Pa..

Entered as Second Class Matter February 6, 1915, at the Postoffice at Pittsburgh, under the Act of March 3, 1879.

Vol. XXXIV
No. 9

Pittsburgh, Pa., Oct. 24, 1935

$1.00 Per Year
25c Per Copy

INDEX—ADVERTISERS.

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THOMAS R. FITZPATRICK, Freight Traffic Manager, P. & L. E. R. R., Pittsburgh, Pa.
WILLIAM R. GELLATLY, President, Superior Railway Products Corp., Pittsburgh, Pa.
P. W. HEPBURN, Sales Engineer, Gulf Refining Company, Pittsburgh, Pa.
W. B. MOIR, Chief Car Inspector, Pennsylvania Railroad, Pittsburgh, Pa.
C. W. TRUST, Assistant Traffic Manager, Carnegie Steel Company, Pittsburgh, Pa.
CHARLES M. WHEELER, Sales Engineer, Union Switch & Signal Co., Swissvale, Pa.

PAST PRESIDENTS:

*J. H. McCONNELL	October, 1901, to October, 1903
*L. H. TURNER	November, 1903, to October, 1905
*F. H. STARK	November, 1905, to October, 1907
*H. W. WATTS	November, 1907, to April, 1908
*D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATTERS	November, 1910, to October, 1912
*A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
*J. G. CODE	November, 1916, to October, 1917
*D. M. HOWE	November, 1917, to October, 1918
*J. A. SPIELMAN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAN	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEO. D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925
F. G. MINNICK	November, 1925, to October, 1926
G. W. WILDIN	November, 1926, to October, 1927
E. J. DEVANS	November, 1927, to October, 1928
W. S. McABEE	November, 1928, to October, 1929
E. W. SMITH	November, 1929, to October, 1930
LOUIS E. ENDSLEY	November, 1930, to October, 1931
*JOHN E. HUGHES	November, 1931, to October, 1932
F. I. SNYDER	November, 1932, to October, 1933
C. O. DAMBACH	November, 1933, to October, 1934

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

OCTOBER 24th, 1935

The ANNUAL MEETING of the Railway Club of Pittsburgh was called to order at the Fort Pitt Hotel at 8 o'clock, P. M., with President R. H. Flinn in the chair.

Attendance as shown by registration cards, 683 persons, seven of whom neglected to sign cards at door.

MEMBERS

Adams, Frank W.
Adams, W. A.
Allison, John
Ambrose, W. F.
Ament, F. Chalmer
Anderson, G. S.
Anderson, H. N.
Anderson, J. G.
Armstrong, C. B.
Aulbach, A. J.
Baker, George N.
Baker, J. B.
Balsley, James I.
Barr, H. C.
Bauer, Fred C., Jr.
Baughman, G. W.
Baumann, E. G.
Beam, E. J.
Beatty, Raymond N.
Beeson, H. L.
Beltz, J. D.
Berg, Karl
Best, D. A.
Bishop, H. G.
Blest, M. C.
Bonhoff, E. L.
Bradley, J. P.
Britt, T. E.
Brown, C. C.
Buchanan, C. C.
Buffington, W. P.
Burel, W. C.
Burnette, G. H.
Burriss, Walter C.
Butcher, F. M.
Callahan, D. E.
Callahan, F. J.
Campbell, W. T.
Cannon, T. E.
Carey, C. D.
Carr, T. W.
Carroll, D. C.
Carson, John
Catt, C. E.
Cavanaugh, T. J.
Chaffin, H. B.
Chilcoat, H. E.
Chipley, G. R.
Christy, F. X.
Christy, George J.
Cipro, Thomas
Clark, C. C.
Clements, F. C.
Clowes, W. K.
Coombe, A. B.
Cooper, A. H.
Coulter, A. F.
Courtney, H.
Crawford, Burt H.
Cree, W. M.
Crenner, J. A.
Crow, C. C.
Cruikshank, J. C.
Cunningham, R. I.
Curley, Walter J.
Curtis, V. K.
Daley, C. A.
Dalzell, W. E.
Dambach, C. O.
Daugherty, W. A.
Davies, James
Davis, Charles S.
Davis, John W.
Dean, E. E.
Dehne, G. C.
Dempsey, A.
Denehey, R. H.
Dennis, J. G.

Devine, J. C.
Dickinson, B. F.
Dickinson, T. R.
Dickson, K. B.
Dierker, R. H.
Diven, J. B.
Doyle, T. E.
Dunbar, H. F.
Durell, W. A.
Durkin, James E.
Durnell, W. E.
East, Lewis P.
Edmonston, G. F.
Edwards, Walter
Egbert, J. A.
Egly, M. J.
Ellis, C. B.
Emerick, J. B.
Emery, E.
Endsley, Prof. Louis E.
Evans, Charles S.
Evans, R. E.
Fair, J. M.
Farlow, G. B.
Farmer, C. C.
Ferguson, George
Fike, J. W.
Finegan, F. A.
Fischer, J. F.
Fisher, John J.
Fleckenstein, August
Flinn, R. H.
Forrester, J. B.
Forsberg, R. P.
Forsythe, George B.
Fox, George W.
Fox, M. C.
Fralic, C. F.
Frauenheim, Pierce H.
Freshwater, F. H.
Friend, Edward F.
Furch, George J.
Gardiner, J. E.
Gardner, George R.
Gatfield, Phillip
Gauvey, F. J.
Geiser, W. P.
Gellatly, Wm. R.
Gemmell, R. W.
Gilbert, William J.
Gilg, Henry F.
Gillespie, J. Porter
Gillum, J. S.
Glaser, C. J.
Glaser, J. P.
Glenn, J. H.
Goldstrom, G. E.
Goron, F. W.
Gray, H. H.
Gray, T. H.
Grieve, Robert E.
Groves, Walter C.
Grunden, B. C.
Guinnip, M. S.
Haggerty, J. F.
Haller, Nelson M.
Hamilton, W. H.
Hance, R. H.
Hancock, Milton L.
Hankey, E. B.
Hansen, William C.
Harper, G. C.
Harper, J. T.
Harris, J. P.
Hassler, E. S.
Hayward, Carlton
Heed, H. L.
Hemma, Charles H.
Hepburn, P. W.
Herrold, A. E.
Hilstrom, A. V.
Hoffman, Eugene L.
Holmes, E. H.
Honsberger, G. W.
Hook, C. H.
Hoopes, R. E.
Hoover, J. W.
Hopper, George
Hornefius, S. R.
Huber, H. G.
Hunt, Lawrence
Hykes, W. H.
Johnson, Ira S.
Johnson, J. W.
Johnson, L. H.
Jones, L. E.
Jones, William M.
Keeney, A. R.
Keller, R. E.
Kelly, R. B.
Kennedy, G. N.
Kentlein, John
Kerby, D. D.
Kerr, Charles, Jr.

Kerr, C. R.
Kessler, A. L.
King, E. C.
Kirk, W. B.
Kiskadden, H. L.
Klassen, Fred G.
Knable, G. Elkins
Knoff, R. A.
Krahmer, E. F.
Krause, H. A.
Kroske, J. F.
Kruse, J. F. W.
Kuhn, S. H.
Kulp, J. G.
Lackner, R. A.
Lanahan, Frank J.
Lanahan, J. S.
Landis, W. C.
Larson, W. E.
Lees, Tom
Leet, C. S.
Lincoln, J. J., Jr.
Long, R. M.
Longstreth, W. L.
Looman, F. W.
Lynn, Samuel
MacDonald, William C.
Marsh, Ernest A.
Masterman, T. W.
Masters, William C.
Matthews, R. J.
Mayer, L. I.
Meinert, Henry J.
Meredith, A. R.
Merz, G. L.
Millar, C. W.
Miller, John
Miller, R. E.
Miller, W. J.
Mills, C. C.
Misklow, C. J.
Misner, George W.
Mitchell, A. T.
Mitchell, F. K.
Mitchell, W. S.
Moir, W. B.
Montague, C. F.
Moore, Donald O.
Morgan, A. L.
Morgan, Homer C.
Mowry, John W.
Muir, R. Y.
Mulvey, J. I.
Murray, C. C.
Musgrove, W. W.
McCandless, William A.
McCauley, William
McCormick, E. S.
McCully, D. L.
McDowell, C. G.
McGeorge, D. W.
McHugh, C. A.
McKinley, A. J.
McKinley, J. T.
McLaughlin, H. B.
McMillan, A. P.
McNeal, A. R.
McOsker, C. T.
McPherson, A. R.
McQuiston, C. A.
McTighe, B. J.
Nagel, James
Nestor, T. E.
Nichols, S. A.
Nieman, C. J.
Nieman, Harry L.
Noonan, Daniel
Oberlin, A. C.
O'Leary, J. J.
Orchard, Charles
Osborne, Raymond S.
O'Sullivan, J. J.
O'Toole, J. L.
Overholt, B. C.
Paisley, F. R.
Palmer, E. A.
Passmore, H. E.
Pearl, W. W.
Pickard, S. B.
Pillar, Michael
Poe, C. F.
Pollock, J. H.
Posteraro, S. F.
Prichard, Hugh R.
Pringle, P. V.
Prinkey, Clyde M.
Purchard, Paul
Rankin, B. B.
Rankin, R. E.
Rauschart, E. A.
Read, A. A.
Rebstock, J. B.
Redding, R. D.
Reed, E. S.

Reed, M. R.
Reeser, Harvey J.
Reeve, George
Renshaw, W. B.
Reymer, C. H.
Reynolds, A. C.
Riley, O. W.
Roberts, E. L.
Rodkey, C. C.
Rowles, H. N.
Rumbarger, F. A.
Rupp, Edwin S.
Rushneck, G. L.
Ryan, D. W.
Ryan, Frank J.
Sample, W. E.
Sarchet, Roger
Schadt, Alton D.
Schaffer, W. E.
Schako, E. J.
Schaller, A. J.
Schauers, Robert W.
Schmitt, Andrew
Schrecongost, C. P.
Searles, E. J.
Seibert, W. L.
Seltman, O. W.
Semmer, M. R.
Sersch, J. G.
Servais, Francis W.
Severn, A. B.
Shackelford, L. P.
Sharpless, G. G.
Shellenbarger, H. M.
Shepherd, W. B.
Sheridan, T. F.
Shingledecker, J. C.
Shuster, W. W.
Simpkins, Fred E.
Sixsmith, G. M.
Slater, A. H.
Smith, J. Frank
Smith, R. B.
Snyder, F. I.
Steiner, P. E.
Stephen, James
Stevens, L. V.
Stevenson, H. G.
Stevenson, R. F.
Stewart, J. C.
Stillwagon, C. K.
Stoecker, J. P.
Stoffregen, Louis E.
Stucki, A.
Stuebing, A. F.
Sullivan, A. W.
Sullivan, P. W.
Sullivan, R. J.
Swope, B. M.
Taylor, H. D.
Ternent, H. J.
Teufel, W. O.
Thomas, T.
Thompson, H. C.
Tipton, G. M.
Tomasic, N. M., Jr.
Tracey, J. B. A.
Trautman, Harry J.
Trax, L. R.
Triem, W. R.
Trump, Perry
Tucker, John L.
Uhar, John J.
Urtel, E. J.
Van Horne, C. F.
Van Vranken, S. E.
Van Woert, F. E.
Van Wormer, G. M.
Vowinkel, Fred F.
Ward, N. H.
Warfel, John A.
Waterman, E. H.
Waxler, Brice
West, G. S.
Westerman, F. R.
Wheeler, C. M.
Wikander, O. R.
Wildin, George W.
Williams, A. G.
Williams, J. W.
Williams, O. J.
Wilson, James R.
Wilson, W. S.
Wilson, W. Stuart, Jr.
Winslow, G. W.
Winslow, S. H.
Woods, G. M.
Woodward, R.
Wright, Edward W.
Wright, H. C.
Wright, John B.
Wuerthele, H. A.
Wynne, F. E.
Yarnall, Jesse
Young, Charles R.
Zearley, J. P.

VISITORS

Abbott, L. J.
Ackenheil, A. C.
Ainsworth, J. H.
Alexander, Samuel
Anderson, G. S., Jr.
Anderson, R.
Angel, Jack
Anger, C. E.
Anger, John G.
Arnold, J. G.
Atkins, H. E.
Bagaley, W. W.
Ball, James B.
Barnes, William W.
Barrie, S.
Bearinger, R. W.
Beitzel, H. J.
Bell, R. P.
Bender, H. P.
Berkohen, Charles, Jr.
Bischoff, E. H.
Bochert, C. G.
Baker, George
Bolinger, William
Bollman, Arthur
Bayer, W. H.
Brown, Homer
Brown, R. J.
Bryant, L. J.
Buffington, W. P., Jr.
Burgess, T. S.
Burgess, W. C.
Burgess, W. T.
Burton, John
Canetta, John
Chamberlin, Charles J.
Chaplin, Bert
Cich, George
Clark, John M.
Clarke, Harry R.
Colchaser, L. A.
Cook, J. A.
Corbett, W. H.
Craig, James A.
Craig, John J.
Cravener, J. H.
Crittenden, P. L.
Cubra, M.
Daly, C. F.
Dambach, J. C.
Davenport, H. M.
Dick, Winfred O.
Dinsmoor, F. L.
Edsall, S. D.
Eichner, John
Eichhorn, T. F.
Elliott, L. M.
Fagan, Ray
Fark, P. J.
Finck, M. S.
Fisher, A. A.
Fisher, G. M.
Fletcher, Albert
Flynn, Edwin E.
Follett, W. F.
Fowler, W. E., Jr.
Fownes, S.
Fox, George H.
Fraser, David
Friend, R. A.
Funfer, James
Funfer, Vincent
Furch, George J., Jr.
Gaffney, Thomas H.
Gammiere, C. J.
Gardner, G. A.
Geisler, J. J.
George, W. J.
Germak, George A.
Gill, A. H.
Gillen, J. G.
Gepard, William
Golladay, J. T.
Goodwin, A. E.
Gower, Robert
Granger, W. H.
Gray, C. C.
Gray, George R.
Greenawald, M. G.
Grigg, R. W.
Grimley, R. H.
Grimm, W. R.
Grove, C. S.
Gurnsy, Fred A.
Gyekis, Joseph A.
Haggerty, C. L.
Haggerty, J. F., Sr.
Hall, John M.
Hamilton, J. S.
Hamilton, W. T.
Hammer, G. O.
Handrock, W. H.

Hartley, J. G.
Hastings, W. S.
Heck, L. W.
Helmkamp, R. F.
Hendershot, E. W.
Henderson, Gene
Henderson, Reed
Herlehy, D. T., Jr.
Hess, Charles A.
Hess, R. A.
Hibbs, A. R.
Hicks, L. W.
Higginbottom, S. B.
Hildenbrand, L. B.
Hill, A. H.
Hockenberry, H. D.
Holt, James
Hoover, Jack
Hope, R. A.
Horvat, Andrew J.
Hughes, Tom
Hull, S. R.
Isenberg, Samuel, Jr.
Jackson, C. F.
Jacobs, A.
Janeway, D. H.
Jenkins, James G.
Jennings, Emil
Jones, Harry G.
Judelsohn, Fred
Junker, J.
Kemmler, Edward C.
Kennedy, J. D.
Kerr, Dr. James P.
Knapp, R. F.
Koepp, R. J.
Kohl, C. G.
Kopp, F. W.
Kramer, A. K.
Kuhn, B. F.
Kulp, W. A.
Kustes, T. F.
Ladd, C. E.
Lawrence, C. H.
Leaf, Clarence S.
Leaf, Russell
Lewis, N. F.
Lewis, S. B.
Lindemann, P. W.
MacDonald, Donald J.
Marshall, L. L.
Marx, Frank J.
Maurer, Edward L.
Maurhoff, E. R.
Miller, A. S.
Miller, James
Miller, Paul
Misklow, L. P.
Mitchell, H. T.
Mitchell, John
Mitchell, L.
Moller, Frank J.
Moore, D. M.
Morford, R. F.
Morgan, William T.
Moritz, J. W.
Morris, W. E.
Morrison, Glenn W.
Mullin, A. C.
Murphy, T. V.
Mycoff, George H.
McAuliffe, T. B.
McCarthy, F. C.
McCarthy, J. C.
McConn, G. E.
McCreery, J. C.
McCuean, Wallace C.
McDowell, L. C.
McGinnis, P. B.
McGovern, J. J.
McGrath, J. E.
McLaughlin, Howard., Jr.
McMullin, George B.
McNamara, T. J.
McVicker, M.
Nagel, William
Neff, Charles
Neely, Harold
Nelson, H. L.
Nichols, R. C.
O'Laughlin, M. J.
Ord, George H.
Parker, W. S.
Parry, George O.
Parry, G. O., Jr.
Pelkar, S. A.
Penn, C. D.
Pickels, H. D.
Pierce, H. E.
Phlegar, A. B.
Ramsay, Dennis W.
Reed, James J.
Richardson, W. H.
Rider, Herman

Riggs, William F.
Robertson, M. R.
Robinson, H. J.
Rowles, C. B.
Rummel, George
Ryne, E.
Sanders, C. R.
Schertzinger, L. G.
Schmidt, Henry S.
Schnepp, Anthony J.
Schock, Peter
Schrifer, H. A.
Schurch, H. C.
Segner, M. W.
Seidell, Donald W.
Seitz, W. W.
Seroky, Edward A.
Severn, John J.
Sexton, E. P.
Shade, Charles F.
Shaffer, M.
Shaw, Milton H.
Sheldon, Fred B.
Shropshire, Paul
Singiser, Grant
Smith, Frank D.
Smith, M. L.
Smith, Sion B.
Smith, S. M.
Snelsire, John
Snyder, H. C.
Snyder, J. S.
Specht, K. M.
Spinose, A. V.
Stauffer, C. D.
Steinecker, A. L.
Stevens, A. R.
Steward, W. M.
Street, Benjamin C.
Street, C. K.
Tekula, P. M.
Thomas, J. R.
Thomas, R. A.
Tomlinson, J. H.
Towles, N. C.
Tripp, Winfield C.
Troop, C. F.
Tuski, T. M.
Vandivort, R. E.
Van Peir, A. N.
Vogel, E. E.
Walker, W. S.
Walton, H. R.
Walts, J. S.
Ward, Howard C.
Warner, A. C.
Warner, R. H.
Warrensford, Fred S.
Wassel, P. W.
Wedge, John T.
Weir, Henry J.
Weitzel, A. G.
Weitzel, Carl, Jr.
Weitzel, C. E.
Weitzel, H. W.
White, J. J.
Wiechelt, P. R.
Wiechelt, W. L.
Wilcox, Walter
Williamson, J. A.
Williamson, James M.
Winton, C. A.
Winton, David
Wolf, Joseph
Yohe, J. K., Jr.
Zec, M.
Zec, Paul
Zeigler, Ross

Before the business session was called to order the audience enjoyed an enthusiastic community sing, and a charming solo by Mr. Fred Judelsohn, of the Air Reduction Sales Company organization.

PRESIDENT: We have quite a little business to go through before we put on the entertainment. We will make it as brief as possible but it must be done, so I will ask your attention to that subject.

You have all signed registration cards so we will dispense with the calling of the roll; also with the reading of the minutes of the last meeting, as you have all received the printed Proceedings.

Next we will read the list of new members. For the benefit of those who may not have been with us before I will say that it is our custom to have the new members rise as their names are called so we can recognize them. Because of the height of the fancy hats you are all wearing I will ask the new members to raise their hands as they stand so they may be distinguished from those about them.

Aivalotis, John, Assistant Car Foreman, B. & O. R. R. Co., Midway, Pa. Recommended by T. E. Britt.

Balsley, J. I., Assistant General Foreman, B. & O. R. R. Co., 406 Zara Street, Knoxville, Pittsburgh, Pa. Recommended by T. E. Britt.

Bauer, F. C., Assistant Agent, Railway Express Agency, 480 Antenor Avenue, Overbrook, Pittsburgh, Pa. Recommended by H. L. Heed.

Brahm, Donald P., Clerk, Baltimore & Ohio Railroad, 407 B. & O. Building, Pittsburgh, Pa. Recommended by T. E. Britt.

Carey, Charles D., Railway Sales, Gulf Refining Company, Gulf Building, Pittsburgh, Pa. Recommended by D. W. McGeorge.

Clark, E. C., Clerk, Pennsylvania Railroad, 77 Kendall Avenue, Bellevue, Pittsburgh, Pa. Recommended by W. B. Moir.

Crawford, Burt H., Clerk, Pennsylvania Railroad, 316 Fisk Avenue, Bellevue, Pittsburgh, Pa. Recommended by W. B. Moir.

Darrah, C. B., Supervisor Telegraph and Signals, Pennsylvania Railroad, 97 Linshaw Avenue, Ingram, Pittsburgh, Pa. Recommended by C. M. Wheeler.

Dickinson, B. F., Engineer Telegraph and Signals, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by C. M. Wheeler.

Glaser, C. J., Statistical Clerk, B. & O. R. R. Co., 302 Winston Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Hunt, Francis M., Jr., Supervisor Station Service, Pennsylvania Railroad, 1006 Pennsylvania Station, Pittsburgh, Pa. Recommended by W. B. Moir.

Hutchison, George, Jr., District Sales Manager, The Duff-Norton Manufacturing Company, P. O. Box 1889, Pittsburgh, Pa. Recommended by J. D. Conway.

Jenkins, G. A., Patrolman, B. & O. R. R. Co., 362 Flowers Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Jones, George, Sr., General Boiler Foreman, B. & O. R. R. Co., 605 Hazelwood Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Kemp, Archie, Engineer, Pennsylvania Railroad, Elks Club, Altoona, Pa. Recommended by J. F. Kroske.

Kim, J. B., Gang Foreman, Pennsylvania Railroad, 7354 Hamilton Avenue, Pittsburgh, Pa. Recommended by H. G. Huber.

Matuseski, Robert R., Gang Foreman, Pennsylvania Railroad, Pittsburgh, Pa. Recommended by H. G. Huber.

Mellor, C. L., Vice President, Barco Manufacturing Company, 1801 Winnemac Avenue, Chicago, Ill. Recommended by W. R. Gellatly.

Morton, R. A., Machine Shop Foreman, B. & O. R. R. Co., 236 Johnstone Avenue, Hazelwood, Pittsburgh, Pa. Recommended by T. E. Britt.

McCandless, William A., Passenger Trainman, Pennsylvania Railroad, 206 Alwine Avenue, Greensburg, Pa. Recommended by W. B. Moir.

McOsker, C. T., Inspector of Accounts, B. & O. R. R. Co., 1028 Bellaire Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Poe, C. F., Timekeeper, B. & O. R. R. Co., 1309 Brookline Boulevard, Pittsburgh, Pa. Recommended by T. E. Britt.

Prinkey, Clyde M., Timekeeper, B. & O. R. R. Co., 604 West North Avenue, Pittsburgh, Pa. Recommended by T. E. Britt.

Trump, Perry, Chief Clerk, Car Department, B. & O. R. R. Co., 229 Winston Street, Pittsburgh, Pa. Recommended by T. E. Britt.

Waxler, Brice, Clerk, Pay Roll Department, Pennsylvania Railroad, 37 Haldane Street, Crafton, Pittsburgh, Pa. Recommended by W. B. Moir.

Wuerthele, Howard A., Clerk, B. & O. R. R. Co., 1239 McNeilly Avenue, Dormont, Pittsburgh, Pa. Recommended by T. E. Britt.

Wright, Harold C., Assistant Master Mechanic, Pennsylvania Railroad, 414 Willow Place, Edgewood, Pittsburgh, Pa. Recommended by W. O. Teufel.

PRESIDENT: Gentlemen, we welcome you into the membership of the Railway Club of Pittsburgh. We hope your first meeting tonight will be a pleasant one and you will want to come back again. We are happy to have you with us and we hope you will get as much out of the Club as we hope to get out of your association with us.

Mr. Secretary, are there any announcements?

SECRETARY: Nothing.

PRESIDENT: It is something of a relief to know that there have been no deaths in our membership during the last month, for the Grim Reaper has been hitting us pretty hard blows in recent months.

This is the Annual Meeting and we are to hear the annual reports of the various officers. We will hear first the annual report of the Treasurer:

TREASURER'S REPORT

Pittsburgh, Pa., October 24, 1935.

To the Officers and Members of
The Railway Club of Pittsburgh.

Gentlemen:

I herewith submit my report for the year ended October 24, 1935:

ON HAND AND RECEIPTS

Cash on hand, October 25, 1934	$1,339.94	
Moneys received from J. D. Conway, Secretary, from October 25, 1934, to October 24, 1935	5,284.25	
Interest on Bonds	130.62	
Total Receipts		$6,754.81

DISBURSEMENTS

Paid on Vouchers No. 829 to 861, inclusive	$4,862.17	
Federal tax on 8 checks at 2 cents each	.16	
Total Disbursements		$4,862.33
Cash Balance		$1,892.48

RESOURCES

Two U. S. Treasury Bonds of $1,000 each, bearing interest at 2⅞%	$2,000.00

One U. S. Treasury Bond of $1,000, bearing interest at 3⅛%, at purchase price	949.39	
Cash Balance	1,892.48	
Total Resources		$4,841.87

NOTE—On account of an order issued by the U. S. Treasury Department, it was necessary to turn in for redemption the two (2) $1,000.00 Liberty Loan Bonds, bearing interest at 4¼%, which were owned by the Club. These bonds were exchanged for two (2) $1,000.00 U. S. Treasury Bonds bearing interest at 2⅞%.

E. J. SEARLES,
Treasurer.

APPROVED:

EXECUTIVE COMMITTEE,
FRANK J. LANAHAN, Chairman.

PRESIDENT: We will now have the annual report of the Secretary:

SECRETARY'S REPORT

Pittsburgh, Pa., October 24, 1935.

To the Officers and Members of
The Railway Club of Pittsburgh.

Gentlemen:

The following is a summary of membership and financial statement for the fiscal year ended October 24, 1935:

Membership reported last year	746	
Received into membership during year	465	
Reinstated	21	
		1,232
Suspended	15	
Resigned	32	
Loss of Address	6	
Deaths reported during year	22	
		75
Present membership		1,157

Of the above membership four are honorary. They are: D. C. Buell, D. F. Crawford, Samuel O. Dunn and John A. Penton.

DECEASED MEMBERS

Name	Died
W. J. Allan	February 23, 1935
Gen. W. W. Atterbury	August 20, 1935
Harold L. Bruner	February 16, 1935
Maurice L. Burgham	July 19, 1935
James E. Campbell	March 7, 1935
J. G. Code	July 6, 1935
Joel S. Coffin	March 11, 1935
V. W. DeLaney	July 27, 1934
Charles Fair	March 7, 1935
O. F. Goodman	May 1, 1935
S. R. Henry	August 17, 1935
Bert Hyanes	August 9, 1935
W. C. Lang	October 26, 1934
Harry W. Lehr	August 15, 1935
Walter H. Myers	March 28, 1935
J. P. McIlwain	July 17, 1935
F. J. Nannah	December 11, 1934
H. M. Rieker	December 17, 1933
C. R. Rowley	March 24, 1935
F. E. Symons	January 23, 1935
H. S. Tarr	June 1, 1934
Daniel J. Whalen	April 17, 1935

RECEIPTS

In hands of Treasurer at close of last year	$4,289.33	
From advertisements	1,117.50	
From dues	3,705.00	
From sale of Proceedings	21.50	
Smoker tickets and dinner, October 25, 1934	393.50	
Miscellaneous sources	46.75	
Interest on bonds	130.62	
		$9,704.20

DISBURSEMENTS

Printing Proceedings, notices, mailing, etc.	$2,007.39
Luncheon, cigars, postage, etc.	940.90
Reporting meetings	180.00
Dinner, Entertainment, Smoker, etc., October 25, 1934	429.35
Salaries and advertising expense	1,111.75
Moving pictures	51.00
Messenger service, affidavits, etc.	18.00

Premium on Bonds—Treasurer and Secretary	14.00	
Floral pieces	7.00	
Various entertainment at meetings	64.28	
Incidentals	38.50	
Federal tax on checks	.16	
		$4,862.33
Net Balance, at close of year		$4,841.87

NOTE—Balance is made up of $1,892.48 cash and two U. S. Treasury Bonds, $1,000.00 each, 2⅞% interest, and one $1,000.00 U. S. Treasury Bond, 3⅛% interest, at cost of $949.39.

J. D. CONWAY, Secretary.

APPROVED:

EXECUTIVE COMMITTEE,
FRANK J. LANAHAN, Chairman.

We have audited the accounts of the Secretary and Treasurer, and find them correct as reported.

FINANCE COMMITTEE,
F. X. CHRISTY, Chairman,
E. EMERY,
G. W. HONSBERGER.

Next is the Report of the Advertising Committee, which I have here and will read myself.

Mr. R. H. Flinn,
President, The Railway Club of Pittsburgh,
Pittsburgh, Pa.

Dear Sir:

The following is the annual report of your Advertising Committee:

Total Number of Advertisers—January 1, 1935	23
Total Number of Advertisers—October, 1935	34
INCREASE	11
Total Amount of Advertising—January 1, 1935	$ 650
Total Amount of Advertising—October, 1935	1,040
INCREASE	$ 390

During the year your Committee secured new advertising as follows:

Name of Advertiser	Amount of Contract
Okonite-Callender Cable Company, Inc., Pittsburgh	$ 50.00
Penn Iron & Steel Co., Creighton, Pa.	20.00
Nathan Manufacturing Company, New York	20.00
Savarin Restaurant, Pittsburgh	40.00
Worthington Pump & Machinery Corp., Harrison, N. J.	40.00
Pennzoil Company, Pittsburgh	100.00
Pennsylvania Transfer Company, Pittsburgh	20.00
Valve Pilot Corporation, New York	20.00
Jones & Laughlin Steel Company, Pittsburgh	40.00
Edgewater Steel Company, Oakmont, Pa.	20.00
Fort Pitt Hotel, Pittsburgh	20.00
TOTAL	$390.00

While we did not manage to reach the advertising objective which we set at the beginning of the year, I am sure the increase in advertising will be pleasing to you and the Executive Committee and if a similar number of new advertisers with similar advertising revenue can be secured during the coming year, in addition to holding that advertising which we now have, then the revenue received from advertising will fully finance the printing and distribution of the Official Proceedings and this, of course, should continue to be the objective of your Advertising Committee. The helpful co-operation of all members of the Club in securing new advertising or furnishing your Advertising Committee with leads is solicited.

Yours very truly,

KARL BERG,
H. E. PASSMORE,
E. A. FOARD.

PRESIDENT: The Reception and Attendance Committee tells me there are more than 650 people in the room tonight. I do not know whether that is a record or not but it is away ahead of anything we have had within my recollection. It is fine to know that there are so many of us here tonight.

You will remember that owing to the removal from the city of the Chairman of the Membership Committee Mr. Sixsmith was appointed as temporary Chairman, and he will present the report of that Committee, and also of the Reception and Attendance Committee, of which he is the official Chairman.

Mr. President and Members of

The Railway Club of Pittsburgh:

On behalf of the Membership Committee, and the Reception and Attendance Committee, I submit for the fiscal year just ending, reports as follows:

FOR THE MEMBERSHIP COMMITTEE

At the present time we are carrying in our records 1,157 members, which includes 465 new members secured during the year, classified as follows:

Pennsylvania Railroad	303
Pittsburgh & Lake Erie Railroad	101
Baltimore & Ohio Railroad Company	89
Bessemer & Lake Erie Railroad Company	30
Pittsburgh & West Virginia Railway Company	29
Union Railroad Company	26
Montour Railroad Company	17
Donora Southern Railroad Company	6
Monongahela Railway Company	6
Monongahela Connecting Railroad Company	4
Aliquippa & Southern Railroad Company	3
Alton & Southern Railroad	2
Pittsburgh & Shawmut Railroad Company	2
Allegheny & South Side Railway	1
Chicago Great Western Railroad Company	1
Delaware & Hudson Railroad	1
Delaware, Lackawanna & Western Railroad Company	1
Detroit, Toledo & Ironton Railroad Company	1
Lake Terminal Railroad Company	1
Long Island Railroad Company	1
Pittsburgh, Chartiers & Youghiogheny Railway Company	1
Pittsburgh, Lisbon & Western Railroad Company	1
Pittsburgh, Shawmut & Northern R. R. Co.	1
Southern Pacific Lines	1
Union Pacific System	1
Unity Railways Company	1
Western Allegheny Railroad Company	1
Western Maryland Railway Company	1
Winfield Railroad Company	1
Railroads	634
Industrial and all others	523
Total membership	1,157

You will recall the resolution adopted in the December, 1934, meeting, whereby all membership dues remaining unpaid for 1933 and prior thereto be cancelled, and that delinquent members at that time would be restored to good standing and have their unpaid 1934 dues cancelled upon payment of 1935 dues, then payable, providing members availed themselves of this special privilege before the February, 1935, meeting.

This resolution applied to the status of 116 members, of whom 91 took advantage of it, 7 resigned, 1 died, 1 loss of address, and 16 were suspended.

As of August 1, this year, 98 members were delinquent. At the request of the President, the Membership Committee conducted a campaign to bring the membership as nearly up-to-date as possible, with the result that 49 of the 98 paid up, 2 resigned and 1 died. Our delinquent list at the present time is therefore small and many of them have indicated intention of getting in good standing soon.

I will report now for the RECEPTION AND ATTENDANCE COMMITTEE:

This Committee has been quite active, and I believe useful, during the year. Each member was furnished an identification badge, and in addition to creating greater acquaintanceship among the members, assisted in many ways in handling the large attendance at the various meetings.

Every effort, aside from natural impulses, to influence attendance at these meetings, has been made, and with gratifying results.

The average attendance this year was 351, an increase of 49.36% over 1934, when we had an average attendance of 235.

This is probably the last time I will report for these two Committees, and I want to take advantage of the opportunity afforded to thank the various members for their wholehearted support and helpful assistance in carrying out the wishes of the Executive Officers.

PRESIDENT: Thank you, Mr. Sixsmith. That is a fine report.

I understand Mr. Dambach has as his guest Dr. James P. Kerr, Controller of the City of Pittsburgh. I wonder if he would not stand up and take a bow and perhaps say a few words.

DR. JAMES P. KERR: Mr. Chairman and Gentlemen of the Railway Club of Pittsburgh. It is a very great privilege for me to be here this evening and meet all you good people. I am not going to make a speech because I am fed up on speech making. But I just want to thank you for the privilege of joining this fine company of people and to express the hope that I may be privileged to come back with you again at some future time. I thank you very much.

PRESIDENT: Thank you, Dr. Kerr. Next in order is the Report of the Tellers of Election. I will ask Mr. Conway to read that report.

SECRETARY: The Report of the Tellers of Election is as follows:

Total number of votes 302, and the vote in each case unanimous for the gentlemen named.

PRESIDENT—R. P. Forsberg, Chief Engineer, Pittsburgh & Lake Erie Railroad, Pittsburgh, Pa.

FIRST VICE PRESIDENT—E. A. Rauschart, Mechanical Superintendent, Montour Railroad Company, Coraopolis, Pa.

SECOND VICE PRESIDENT—G. M. Sixsmith, Superintendent, Pennsylvania Railroad, Pittsburgh, Pa.

SECRETARY—J. D. Conway.

TREASURER—E. J. Searles, Manager, Schaefer Equipment Company, Pittsburgh, Pa.

EXECUTIVE COMMITTEE—Frank J. Lanahan, Chairman; A. Stucki, Samuel Lynn, D. F. Crawford, G. W. Wildin, W. S. McAbee, E. W. Smith, Louis E. Endsley, F. I. Snyder, C. O. Dambach, R. H. Flinn.

SUBJECT COMMITTEE—D. W. McGeorge, Chairman, 3 years; John B. Wright, one year; M. R. Reed, 3 years.

RECEPTION AND ATTENDANCE COMMITTEE—J. D. Beltz, Chairman, 3 years; W. C. Burel, Vice Chairman, 2 years; J. B. Baker, Walter C. Sanders, G. A. Blackmore, J. S. Lanahan, 1 year; J. A. Warfel, J. C. Shingledecker, J. C. Dilworth, G. H. Burnette, W. R. Triem, 2 years; J. W. Hoover, J. W. Johnson, A. A. Read, C. P. Schrecongost, 3 years.

ENTERTAINMENT COMMITTEE—J. Porter Gillespie, Chairman, 3 years; Frank E. Weis, Vice Chairman; E. H. Holmes, C. C. Clark, A. L. Kessler, T. F. Sheridan, 2 years; James Nagel, 3 years.

MEMBERSHIP COMMITTEE—William R. Gellatly, Chairman, 3 years; T. E. Britt, Vice Chairman, 2 years; A. B. Severn, W. P. Buffington, 1 year; R. S. Bull, A. F. Coulter, T. R. Dickinson, D. K. Orr, C. M. Wheeler, A. C. Pollock, W. F. Ambrose, John I. Mulvey, 2 years; Thomas R. Fitzpatrick, P. W. Hepburn, W. B. Moir, C. W. Trust, 3 years.

FINANCE COMMITTEE—J. L. O'Toole, Chairman, 1 year; G. W. Honsberger, 2 years; F. J. Ryan, C. E. Catt, J. W. Boyd, 3 years.

ADVERTISING COMMITTEE—E. A. Foard, Chairman, 3 years; Karl Berg, H. E. Passmore, 2 years.

PRESIDENT: Gentlemen, I can only say to you that I congratulate you upon the election of such a group of officers as you have seen fit to select for the coming year. I do not know that I should make any particular remarks at this time, but I think you should see and hear from some of the men you have elected.

I do not know of any one in this Club to whom I would turn over the gavel more willingly or with a feeling of greater satisfaction than to Mr. Forsberg, whom you have elected as President. He has served you as Chairman of the Subject Committee for a considerable period of years and I know he has done a lot of work and paid a lot of attention to getting the right kind of speakers on the right kind of subjects, and you all know how eminently successful he has been. And it is no easy job, believe me. Will you come up here and say a few words to these boys, Mr. Forsberg?

MR. R. P. FORSBERG: Mr. Chairman and the best set of friends with which any man has ever been surrounded, I want, as far as it is possible for me to do so, to convey to you the depth and the sincerity of my appreciation of the signal honor you have conferred upon me in electing me to the office of President of our Club for the ensuing year.

I will not say this is the happiest event in my life for fear such a statement might in some untoward manner reach the ears of Mrs. Forsberg, and as I am on record with her as stating that my wedding day is the happiest occurrence in my life, I might find blood on the moon when I reach home this evening. But I can in all sincerity and all candor state that when some day I sum up the bright, the joyous happenings that have come into my life, this evening's event will have a very high place in that summation.

I came to Pittsburgh in September, 1892, attracted by the lure of gold. That lure consisted in a ten dollar increase in salary. I was at that time employed as a draftsman with the Norfolk and Western Railway in Roanoke, Virginia, at the munificent salary of $55.00 per month, and when I was offered $65.00 per month by the Pittsburgh and Lake Erie Railroad Company in Pittsburgh, I accepted forthwith and felt that my financial independence was secure forevermore.

I arrived in Pittsburgh an utter and entire stranger. I did not know one single, solitary human being in the entire City, but that condition obtained for a short time only for I soon found myself surrounded by a growing circle of true, loyal, staunch, friends whose number has increased in geometrical proportion as the days have gone by, and I sincerely trust will ever continue to grow.

My home was in the very heart of the "Old South," a region famed, and justly so, for its true and genial hospitality. As a boy, and later as a young man, I loved the traditions of my homeland, I love them no less today than I did at that time, but speaking to you this evening as a man of Southern lineage I say that I have never found in all the boasted hospitality of my native State a hospitality that has equaled that extended to me by the people of Pittsburgh since the day I cast my lot among you; nor had I ever before coming to this City possessed a larger, truer, circle of real friends, a fair representation of which I find around me this evening.

I recall as a boy, in my early teens, reading in a story book, an account of the last days of Benedict Arnold. I was especially impressed with a statement, as I recall it, to the effect that as he was practically dying alone someone said, "Mr. Arnold, is there anything you want?" and he replied, "Yes, I want a friend." I believe that my boyish mind conceived at that time some hazy idea of the value of friendship and that conception has grown with the increasing years.

What is the value of a true friend? Can you measure it? Would you barter, would you trade with it? Take it away from a man, divest him of his friends and there is little left in life for him, you leave him poor indeed, but surround him with a large group of staunch, loyal friends and there is nothing that he will not dare. He will keep on hoping and keep on trusting and keep on believing and keep on enduring until every obstacle is overcome and victory is at last assured.

Gentlemen, as long as memory shall last, as long as my faculties shall continue to function, I will never forget this evening nor the spirit of friendship that has prompted you to elevate me to this office, and "May my tongue cleave to the roof of my mouth, and my right hand forget its cunning," if I ever knowingly prove unworthy of possessing the friendship of such an aggregation of men.

Now, just a word relative to the work that confronts us in the year ahead. I cannot conceive of a more difficult task for any man to assume than that of following the successful the outstanding administration of Rufus H. Flinn; for as a result of the personal efforts he and his associates have put into their work during the past year the affairs of our Club stand tonight at or near high water mark.

But as I have read and read carefully the names of the men making up our various committees and the chairmen who will guide them in their work during the coming year, the conviction has come to me that if these men have any kind of leadership the year 1935-1936 will also be a successful one. I believe Rufus Flinn and his Membership Committee have enrolled every eligible member in Western Pennsylvania and that our only hope lies in securing those who have attained their majority since the last meeting of our Club, and believe you me we are going after each one of them.

You have a distinct and decided advantage over me this evening when we greet each other. As each one of you speak to me you have only one name to remember, I would have six hundred or more to recall in addressing you. Won't you help me in this regard, won't you speak to me when and wherever you meet me, and if I do not know your name I am going to ask you to advise me. And won't you go just a step further, I am known to my more intimate friends as "R. P.", the first two initials of my name and not as Mr. Forsberg. I believe, as I have before stated, that some of my truest and most staunch friends are enrolled in the membership of this Club, and I am, therefore, going to ask each one of them if they will not from this time forth and forevermore address me as "R. P.", and forget all about the Mr. Forsberg angle.

Boys, I have no axe to grind, no fish to fry, no pet scheme to advance, I have no interest in the work of our Club for the ensuing year higher than an honest purpose and a sincere desire to serve you as your President, as you want your President to serve you.

PRESIDENT: Thank you, R. P. I do not need to worry about the future of this Club under the leadership of R. P. It is going ahead to bigger and better things.

The word has just been passed to me that there are 683 in the room. I do not believe there were ever that many at an Annual Meeting of the Club before.

Now is Mr. Rauschart in the room, First Vice-President elect? I believe he is not here. The Second Vice-President elect is here, Mr. Sixsmith, and I will ask him to come forward and say a few words.

MR. G. M. SIXSMITH: Mr. President and fellow Members of the Railway Club of Pittsburgh: You have just listened to the keynote speech of your new President, and I think I am expressing the opinion of all of you when I say that it was a forceful talk and one that speaks well for the future of the Railway Club.

For all of you who do not know me I might say that this is an embarrassing moment. My election as Second Vice-President of this Club and my service in that capacity will not be taken lightly I can assure you. I have found considerable pleasure in working for the Railway Club of Pittsburgh and with the members of this fine organization, and in my new capacity I can assure you that I shall be very glad indeed to carry on in every way I know to improve and increase the popularity of this Club. I feel certain I am speaking the mind of every member of this Club from the Pennsylvania Railroad when I say that we of the Pennsylvania Railroad will be just as free and generous in our support of our new President as we have ever been of any President in the past. And we of the Pennsylvania family will welcome the opportunity of joining with our friends of the Pittsburgh & Lake Erie in making Mr. Forsberg's administration successful in every respect. (Applause). Now, Gentlemen, I can see by your applause that you do not want to hear any more from me; Tumultuous applause.) and will conclude by thanking you for the honor you have bestowed upon me and with a renewal of my promise to do everything I can to justify your confidence.

PRESIDENT: You will remember that about three years ago we had the pleasure of a most interesting and enthusiastic meeting at which we were addressed by Mr. A. G. Pack, who was then Chief Inspector of the Bureau of Locomotive Inspection of the Interstate Commerce Commission. At our last Annual Meeting he was also present and made a few remarks, and we enjoyed seeing and hearing him very much. Tonight through the courtesy of Charlie Nieman, of the Penn Iron and Steel Company, we are going to have the pleasure of seeing Mr. Pack's successor, Mr. John M. Hall. Mr. Pack was retired under the age limit rule and the First Assistant was appointed to fill his place this past summer, and we will have the distinct honor and sincere pleasure of hearing a few words from him at this time. He came out here this morning and some of us have met him and we find him a very delightful fellow and we want him to get acquainted with you and you with him, and we think it will be beneficial for all of you. It is a very real pleasure to present to you Mr. John M. Hall, Chief Inspector, Bureau of Locomotive Inspection, Interstate Commerce Commission.

MR. JOHN M. HALL: Mr. Chairman and Gentlemen of the Railway Club of Pittsburgh: I had a few remarks I thought of making to you tonight but first Dr. Kerr got up and told you how glad he was to be here, so I can not tell you that. Then your incoming President tells you a lot of things why he thinks so much of you fellows and I can't add very much to that, although I fully agree with what they said. But I am very glad to be here, very glad that my genial friend Charlie Nieman asked me to come, and glad to have made so many fine acquaintancs today. I assure you I am a very humble representative of the Bureau of Locomotive Inspection and there is just one reason that I am on the job and that is to promote safety with your assistance. We have had that in full measure heretofore and I know the Bureau hopes to continue to have your full co-operation. And I assure you that in all our relations I desire to be a friend to every one of you.

Of course as Government officers we have sworn duties to perform, but I assure you it will be my purpose to perform those duties with as much consideration as possible, of course in keeping with the duties of my office.

Gentlemen, I thank you. And I hope you will say "Hello, Hall", when you see me, because I may not recognize you as quickly as you do me.

PRESIDENT: Thank you, Mr. Hall.

You will notice I have called on certain of the principal Committees for Annual Reports, which is perhaps different from what has been our custom in the past, but I think the Committees ought to have something to say after all the hard work they have done. We have left a most important committee to the last and I will now ask Mr. Frank J. Lanahan, Chairman of the Executive Committee, to make a report for that Committee.

MR. FRANK J. LANAHAN: Mr. President, Fellow Members and Visitors:

After listening to that bright and scintillating address by our Vice President and the statistics and information furnished by our Secretary as well as the other reports by the various officers made tonight, you have a symposium of the Club's activities during 1934-35, so for the Executive Committee, let me register our satisfaction over the general condition of the organization and unstintingly commend the officers for the results attained and heartily congratulate the entire membership.

Now, let Rufus take us for a ride!

In the last few years, an outstanding American has popularized the appraisement of values by recourse to records and ascertaining facts, so, in taking this little journey tonight, let us use for a Conveyance—the record, and for the Motive Power—the facts covering our activities during 1934-35. The Engineer is our dynamic President, the Crew, his official associates and hard-working committee members. The Illumination of the tracks is generated by the enthusiasm of the monthly sessions. Our Right-of-Way traverses the property and traditions of the Railway Club of Pittsburgh. The Terminals are from the administration of Past President Dambach to incoming President Forsberg.

Let us refer to the records and ascertain the facts as to the training of our Engineer, Rufus H. Flinn. He was initiated into the Club, October 25, 1928; he served on the Reception Committee from November, 1929, to October, 1931; was promoted to the Subject Committee in November, 1931, and became its Chairman in October, 1932. Elected Second Vice President in 1932 and became First Vice President in November, 1933, and was elevated to the Presidency in November, 1934, which position he has filled with notable distinction. As Chairman of the Subject Committee, these are the facts as to his service to the Club:

November, 1931—Frank R. Phillips, President, Philadelphia Co., Pittsburgh, Pa., subject, "Electrification and the Railroads in the Pittsburgh District."

December, 1931—Curtis M. Yohe, Vice President, P. & L. E. R. R. Co., Pittsburgh, Pa., subject, "Pittsburgh and the Railroads."

January, 1932—N. H. McKay, Manager and Metallurgist, United States Chromium Corp., Pittsburgh, Pa., subject, "Chromium Plating Applications in the Railway Industry."

February, 1932—A. G. Pack, Chief Inspector, Bureau of Locomotive Inspection, Interstate Commerce Commission, Washington, D. C., subject, "Federal Bureau of Locomotive Inspection and Its Relation to Locomotive Maintenance."

March, 1932—Samuel O. Dunn, Chairman of Board, Simmons-Boardman Publishing Co., and Editor, Railway Age, Chicago, Ill., subject, "The Present Railway Situation."

April, 1932—J. V. Neubert, Chief Engineer of Maintenance of Way, The New York Central Railroad Co., New York, N. Y., subject, "Track Construction and Roadway Maintenance."

May, 1932—Dr. Paul V. Faragher, Aluminum Company of America, subject, "The Manufacture of Commercial Aluminum and Aluminum Alloys."

A. H. Woollen, Engineer, Development Division, Aluminum Company of America, subject, "Some Applications of Aluminum Alloys in the Transportation Field."

James W. Rickey, Chief Hydraulic Engineer, Aluminum Company of America, subject, "Building a Concrete Dam 'On End' and Blasting It Into Position."

September, 1932—Dr. E. R. Weidlein, Director, Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Pa., subject, "Science in Action."

October, 1932—Annual Meeting—Election of Officers—Smoker.

This will be of interest to you old-timers—the record of attendance at the meetings of Rufus Flinn, from the time of his election to date:

The year he became a member, he was present at 6 meetings, in 1929-30, 5 meetings, 1930-31, 6 meetings, 1931-32, 7 meetings, 1932-33, 7 meetings, 1933-34, 7 meetings, and the year of his Presidency, 1934-35, 9 meetings, or 100%. He has but absented himself from 17 meetings in the 7 years of his membership.

Now, let's go back to the records and look at some other facts. When Rufus was inaugurated President in October, 1934, on the roster of the Club there was a total of 764 members, the total membership today is 1,157, or an increase of 393 members or 51% in twelve months.

Let us turn over another page of the record and get some more facts. Dues paid for year ending October, 1934, were $2,148.00, for the year ending October, 1935, there were $3,705.00 or an increase for the year of $1,557.00 or 72.5%.

That isn't all, another page of the record shows that the average attendance the year previous to Rufus' incumbency was 211 and this year the average raised to 309, an increase of 47%.

Other pages of the records show an innovation in the way of a musical quartet and community singing. They were features in promoting good fellowship and enthusiasm. The novelty of having new members rise and be welcomed into the Club has also been a feature. Eliminated was the embarrassment of calling upon members unexpectedly to speak extemporaneously. As a means of identification, badges were worn by the Reception and Attendance Committee, that they might better serve the backward visitors and members. So successful was this move, that it soon became apparent that the Membership and Reception and Attendance Committees could be profitably enlarged and they were. Then followed, as a help to the Secretary, the Advertising Committee to function as a revenue producer.

All these developments culminated in the Amendment to the Constitution and By-Laws, adopted at the September meeting.

These facts from the records cannot help but argue well for the Club's future, and so it is fitting that we passengers, who have journeyed so pleasantly on this road during the past year, show some recognition of the service rendered and signal out the Engineer for our compliments and enconiums, and make known in some visible manner our appreciation of his services to the common cause. It was this thought that actuated the membership in designating a committee to tender in the name of the Club, and in their behalf, a testimonial to signify the records and facts associated with the accomplishments in the Club's history of 1934-35. This takes the form of a Grandfather's Clock, which you will all observe (if our Secretary, Mr. Conway, will pull aside the curtain), is beautiful to behold and a marvelous timepiece. President Flynn, as a member of the Committee and as the medium of the membership of the Club, I present to you this token of the Club's gratitude for the remarkable manner in which you have conducted the Club's affairs during your occupancy of the Presidency. You have set a standard that will be hard to maintain, and nigh near impossible to improve. The consciousness of your achievements must bring to you full measure of happiness—its own reward. You now relinquish the gavel, signifying an end to your term of President, but we welcome you as an advisor and guide on the Executive Committee, where you join an illustrious line of predecessors. We are counting on you being the same stimulant to the upward and onward program of the Club in that position as has characterized you as chief executive. In passing from the office, you leave a memory of accomplishments that should ever stimulate the membership as a whole to maintain the standing, keep alive the traditions and ever revere the Club to which your loyalty, unbounded enthusiasm and energy have brought honor and glory in every nook and corner of the country where railroads are known.

You, Sir, have our best wishes that in all your undertakings in life, whether they be here in our midst, or far away in still greater fields of activity, it may be your gratification to duplicate the success in the new environment as has characterized your administration of the Railway Club of Pittsburgh. God speed to your endeavors!

PRESIDENT FLINN: Mr. Lanahan and friends of the Railway Club of Pittsburgh, I wish I could express the thoughts that are running through my mind in words adequate to convey to you my deep and sincere appreciation of this beautiful gift which you have seen fit to present to me. I will ever treasure it as a remembrance of the finest association I have ever had in my life. It has been some work, but it has been a distinct pleasure to serve you as your President during the past year. And my hope is that I may be able to continue the pleasure of being an active member of the Club in the years to come.

As your President-elect said to you in his introductory remarks, I have never found in any place or in association with any group a finer hospitality or a more loyal friendship than here in Western Pennsylvania, and I have formed a great many dear and lasting friendships among the members of this Club and I shall always treasure those friendships and the memories those friendships will produce.

I am only too glad to have been able to do what little I could to further the interests of our Club. I had thought to take occasion to say something of the work of the past year but Mr. Lanahan has covered it very fully. Two or three things I was interested in he did not refer to. Through the courtesy of Clarence Mellor, I attended the annual golf outing of the Western Railway Club of Chicago in September and found this a very delightful affair. Through the courtesy of the Traffic & Transportation Association the members of our Club were invited to join them in their bi-weekly golf outings at the Shannopin Country Club and postcards were sent to all of our membership this summer. A number of our members have spoken to me about the desirability of a golf outing for our Club and I will just leave the thought with your new officers.

In addition to that I just want to refer a moment before closing to the Entertainment Committee. You know under the new amendment to the Constitution we have re-organized and enlarged the Entertainment Committee and consolidated it with the Music Committee, of which I had appointed Porter Gillespie as Chairman. During the early part of the year he organized our Club quartette and also introduced community singing. And those of you who were here at the February meeting will remember the excellent minstrel show with home talent. In May we had an excellent mock trial put on by members of the railway police department. Those things were all handled by the Entertainment Committee. You have a splendid Entertainment Committee now and Porter Gillespie will be the Chairman during the coming year and I know he will have many new offerings to entertain you.

It has been my belief that this Club, while it is essentially educational in its aims, is also designed to promote good fellowship among its members. The thought is that in addition to getting something in the way of food for the mind, you should get a little relaxation and good fellowship out of it also. My object has been to promote sociability among the members. And I think that phase of the work of the Club has been largely responsible for the increase in the attendance and the definite increase in the enthusiasm of the meetings. After the entertainment, and after the lunch which will be served immediately after in the Gold Room because there is no room in here to set the tables, we want you all to come back in here because we will have more of the community singing which you all seem to have enjoyed so much. We want you all to have a good time so that you will remember this annual meeting.

I will now turn the meeting over to the Entertainment Committee. But before I step down I just want to say that I thank you from the bottom of my heart, and I can not say anything more than that.

I now turn you over to Porter Gillespie, Chairman of the Entertainment Committee.

MR. J. PORTER GILLESPIE: There was a great diversity of opinion among the members of the Committee as to the form of entertainment that should be given tonight. A great majority wanted a strip dance with naked women, but when it was pointed out that quite a few of the older members and practically all the officers of the Club had already seen a naked woman, we decided to abandon this idea. Then we hit upon the plan of bringing over the Metropolitan Grand Opera Company whose talent, we felt, would be equal to what you have been accustomed to under Frank Weiss' programs. However, I received a telegram just a few days ago, which I shall read to you:

Hollywood, California,

Dear Toots:

Am in the hospital with a severe cold. Regret will be unable to attend Railway Club meeting October 24. Love to all the boys and hugs and kisses to you.

Signed,

GRACIE MOORE.

So, of course, we had to give up that idea also. After stupendous effort on the part of your Committee and at enormous expense to you and to Mr. Conway, we have been successful in securing and transporting to Pittsburgh a soul stirring drama which has been the toast of Broadway and the hit of the century. I refer to the last century. So we ask you to please turn your minds and spirits back to the "Gay Nineties", to the time when you courted your grandchildren's grandmother or vice versa, as the case might have been, to the days when canals were obsolete mud holes and not part of the "New Deal" program, back to the days when the steam railroad's competition came only from rubber tired bicycles, as I turn you over to the capable hands of Mr. George Sharpe and his all-star cast, Mabel Kroman, Tommy and Micky Harris, Brooks and Layton, and that beautiful engenue May Smythe, who will present for your amusement and edification, that blood stirring melodrama: "WHY GIRLS LEAVE HOME."

Between the acts, Mr. Art Barnett, Master of Ceremonies at the Nixon Restaurant, gave two sketches—the first, a splendid imitation of a train ride from Philadelphia to Pittsburgh, and, the second, an imitation of a man starting a Model T Ford. (Mr. Barnett did this free of charge, and my opinion is that it was one of the high lights of the evening.)

J. D. CONWAY, Secretary.

CONSTITUTION

ARTICLE I

The name of this organization shall be "The Railway Club of Pittsburgh."

ARTICLE II

OBJECTS

The objects of this Club shall be mutual intercourse for the acquirement of knowledge by reports and discussion, for the improvement of railway operation, construction, maintenance and equipment, and to bring into closer relationship men employed in railway work and kindred interests.

ARTICLE III

MEMBERSHIP

Section 1. The membership of this Club shall consist of persons interested in any department of railway service or kindred interests, or persons recommended by the Executive Committee upon the payment of the annual dues for the current year.

Sec. 2. Persons recommended by the Executive Committee and by unanimous vote of all members present at any regular meeting of the Club may be made an Honorary Member and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

ARTICLE IV

OFFICERS

The officers of this Club shall consist of a President, First Vice President, Second Vice President, Secretary, Treasurer and an Executive Committee of seven or more members, elected at the Annual Meeting of the Club, for a term of one year. There shall be a Finance Committee of five or more members; a Membership Committee of twelve or more members; an Entertainment Committee of seven or more members; a Reception and Attendance Committee of twelve or more members; a Subject Committee of three or more members; and an Advertising Committee of three or more members; all elected at the Annual Meeting, the term of office to be specified, but in no case to exceed three years. Chairmen and Vice Chairmen of these committees where not named on the ballot will be elected from among the elected members by the Executive Committee.

ARTICLE V

DUTIES OF OFFICERS

SECTION 1. The President shall preside at all regular or special meetings of the Club and perform all duties pertaining to a presiding officer; also serve as a member of the Executive Committee.

SEC. 2. The First Vice President, in the absence of the President, will perform all the duties of that officer; the Second Vice President, in the absence of the President and First Vice President, will perform the duties of the presiding officer. The First and Second Vice Presidents shall also serve as members of the Executive Committee.

SEC. 3. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds.

SEC. 4. The Secretary will attend all meetings of the Club or Executive Committee, keep full minutes of their proceedings; preserve the records and documents of the Club, accept and turn over all moneys received to the Treasurer at least once a month, draw cheques for all bills, when approved by a majority of the Executive Committee present at any meeting of the Club or Executive Committee meeting. He shall have charge of the publication of the Club Proceedings and perform other routine work pertaining to the business affairs of the Club under direction of the Executive Committee.

SEC. 5. The Treasurer shall receipt for all moneys received from the Secretary, and deposit the same in the name of the Club within thirty days in a bank approved by the Executive Committee. All disbursements of the funds of the Club shall be by check signed by the Secretary and Treasurer.

SEC. 6. The Subject Committee will arrange programs and select speakers for the regular meetings of the Club and perform such other duties as may be assisgned them by the President or First and Second Vice Presidents, working in conjunction with the Entertainment Committee as may be required. The Chairman of the Subject Committee will serve as an advisory member of the Executive Committee.

SEC. 7. The Membership Committee will actively engage in building up and maintaining the list of active members of the Club and perform such other duties as may be assigned them by the President or First and Second Vice Presidents. The chairman of this Committee will serve as an advisory member of the Executive Committee.

SEC. 8. The Advertising Committee will solicit advertisements for the Official Proceedings and perform such other duties as may be assigned them by the President or First and Second Vice Presidents. The Chairman of this Committee will serve as an advisory member of the Executive Committee.

SEC. 9. The Reception and Attendance Committee will receive members, guests and visitors at the meetings and generally assist in promoting social intercourse and good fellowship, securing attendance of the members, and performing such other duties as may be assigned them by the President or First and Second Vice Presidents. The Chairman of this Committee will serve as an advisory member of the Executive Committee.

SEC. 10. The Entertainment Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents, and such other duties as may be proper for such a committee.

SEC. 11. The Finance Committee will perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so and perform such other duties as may be assigned them by the President or First and Second Vice Presidents.

ARTICLE VI

ELECTION OF OFFICERS

SECTION 1. The officers shall be elected at the regular annual meeting as follows, except as otherwise provided for:

SEC. 2. The President will appoint a Nominating Committee of five members, three of whom must be regularly elected members of the Executive Committee, who shall at the September meeting recommend nominations for all offices to be filled at the annual meeting and these, together with any other nominations which may be made from the floor under proper procedure, will be printed and mailed as a letter-ballot to all of the members of the Club, not less than twenty days previous to the Annual Meeting, by the elective members of the Executive Committee. Each member may express his choice for the several offices to be filled by properly marking the letter-ballot and returning it to the Chairman of the Executive Committee.

SEC. 3. The elective members of the Executive Committee will present to the President the names of the members receiving the highest number of votes for each office, together with the number of votes received.

SEC. 4. The President will announce the result of the ballot and declare the election.

SEC. 5. Should two or more members receive the same number of votes, it shall be decided by a vote of the members present, by ballot.

ARTICLE VII

AMENDMENTS

Amendments may be made to this Constitution by written request of ten members, presented at a regular meeting and decided by a two-thirds vote of the members present at the next regular meeting.

BY-LAWS

ARTICLE I

MEETINGS

SECTION 1. The regular meetings of the Club shall be held at Pittsburgh, Pa., on the fourth Thursday of each month, except June, July and August, at 8 o'clock P. M.

SEC. 2. The annual meeting shall be held on the fourth Thursday of October each year.

SEC. 3. The President may, at such times as he deems expedient, or upon request of a quorum, call special meetings.

ARTICLE II

QUORUM

At any regular or special meeting twenty-five members shall constitute a quorum.

ARTICLE III

DUES

SECTION 1. The annual dues of members shall be Two Dollars, payable in advance on or before the fourth Thursday of September each year.

SEC. 2. The annual subscription to the printed Proceedings of the Club shall be at the published price of One Dollar. Each member of the Club shall pay for both dues and subscription. Dues and subscription paid by members proposed at the meetings in September or October shall be credited for the following fiscal year.

SEC. 3. At the annual meeting members whose dues and subscription are unpaid shall be dropped from the roll after due notice mailed them at least thirty days previous.

SEC. 4. Members suspended for non-payment of dues shall not be reinstated until all arrearages have been paid.

ARTICLE IV

ORDER OF BUSINESS

1. Roll call.
2. Reading of the minutes of preceding meeting.
3. Reception of new members.
4. Announcements and communications.
5. Appointment of committees.
6. Reports of officers or committees.
7. Unfinished business.
8. New business.
9. Election of officers.
10. Presentation of program and discussion.
11. Adjournment.

ARTICLE V

PUBLICATIONS

SECTION 1. The Proceedings or such portion as the Executive Committee may approve shall be published (standard size, 6x9 inches) and mailed to the members of the Club or other similar clubs with which exchange is made.

ARTICLE VI

The stenographic report of the meetings will be confined to resolutions, motions and discussions of papers unless otherwise directed by the presiding officer.

ARTICLE VII

AMENDMENTS

These By-Laws may be amended by written request of ten members, presented at a regular meeting, and a two-thirds vote of the members present at the next meeting.

MEMBERS

Adams, Charles E.,
Superintendent,
Pennsylvania Railroad,
Pennsylvania Station,
Pittsburgh, Pa.

Adams, Frank W.,
Local Storekeeper,
B. & O. R. R.,
486 Ashby St.,
Hays, Pittsburgh, Pa.

Adams, Walter A.,
Clerk,
P. & L. E. R. R.,
230 Ohio Ave.,
Glassport, Pa.

Adrian, J. H.,
Clerk,
Pennsylvania Railroad,
1931 Noblestown Road,
Pittsburgh, Pa.

Aivalotis, John,
Assistant Car Foreman,
B. & O. R. R. Co.,
Midway, Pa.

Allderdice, Norman,
President,
Auto-Tite Joints Co.,
1001 Park Bldg.,
Pittsburgh, Pa.

Allen, Earl M.,
Engineer (Signal),
Union Switch & Signal Co.,
1318 Lancaster Ave.,
Pittsburgh (18), Pa.

Allen, Harvey,
Mechanical Engineer,
347 Columbia Ave.,
West View,
Pittsburgh, Pa.

Allison, John,
Sales Engineer,
Pgh. Steel Foundry Corp.,
Glassport, Pa.

Ambrose, W. F.,
M. M., Aliquippa & So. R. R.,
1301 Meadow St.,
Aliquippa, Pa.

Ament, F. Chalmer,
Train Service Inspector,
Pgh. Div., Penna. R. R.,
6932 Standish St.,
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Anderson, Burt T.,
Asst. to President,
Union Switch & Signal Co.,
Swissvale, Pa.

Anderson, G. S.,
Foreman,
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Pittsburgh, Pa.

Anderson, H. N.,
Asst. Engineer M. of W.,
B. & O. R. R.,
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Anderson, J. G.,
Inspector Bridges & Buildings
Pennsylvania Railroad,
623 Market Street,
Freeport, Pa.

Anderson, M. M.,
Personnel Manager,
Aluminum Co. of America,
Gulf Building,
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Anne, George E.,
Representative,
American Brake Shoe &
Foundry Co.,
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Altoona, Pa.

Arensberg, F. L.,
President,
Vesuvius Crucible Co.,
Box 29,
Swissvale, Pa.

Armstrong, C. B.,
Railway Sales Manager,
Central Division,
Air Reduction Sales Co.,
332 South Michigan Ave.,
Chicago, Ill.

Armstrong, Joseph G., Jr.,
Asst. to Manager of Sales,
Carnegie Steel Company,
Carnegie Building,
Pittsburgh, Pa.

Arnold, J. J.,
Sales Dept.,
Pressed Steel Car Co.,
McKees Rocks, Pa.

Ashley, F. B.,
Vice President,
Pruett Schaffer Chemical Co.,
Tabor St.,
Corliss Station,
Pittsburgh, Pa.

Atkins, T. Earl,
Branch Manager,
The Pennzoil Company,
Chamber of Commerce
Building,
Pittsburgh, Pa.

Aulbach, A. J.,
Yardmaster, P. & L. E. R. R.,
318 Quincy Ave.,
Mt. Oliver Station,
Pittsburgh, Pa.

Babcock, F. H.,
Safety Agent,
P. & L. E. R. R.,
221 Magnolia Ave.,
Mt. Lebanon,
Pittsburgh, Pa.

Baer, Harry L.,
Pres., Water Treatment Co.
of America,
220 Stanwix St.,
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Bailey, F. G.,
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Standard Steel Car Corp'n.,
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Bailey, J. C.,
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Baily, J. H.,
Vice President,
Edgewater Steel Co.,
P. O. Box 249,
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Bair, J. K.,
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Union Railroad,
139 Brown Ave.,
Turtle Creek, Pa.

Baker, George N.,
Chief Clerk to V. P. & G. M.,
B. & L. E. R. R.,
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Baker, J. B.,
Chief Engr., M. of W.,
Pennsylvania Railroad,
Pennsylvania Station,
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Baker, W. E.,
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Bakewell, Donald C.,
Vice President,
Continental Roll & Steel
Foundry Co.,
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Pittsburgh, Pa.

Balbaugh, John G.,
Sales Engineer,
Pittsburgh Valve Foundry &
Construction Co.,
26th St. & A. V. Ry.,
Pittsburgh, Pa.

Ball, Fred M.,
District Manager,
Franklin Ry. Sup. Co., Inc.,
Broad St. Station Bldg.,
Philadelphia, Pa.

Ball, George L.,
Secretary and Treasurer,
Ball Chemical Co.,
230 S. Fairmont Ave.,
Pittsburgh, Pa.

Balph, M. Z.,
Assistant Engineer,
P. & L. E. R. R.,
3308 Sixth Ave.,
Beaver Falls, Pa.

Balsley, J. I.,
Asst. General Foreman,
B. & O. R. R. Co.,
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Knoxville,
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Balzer, C. E.,
Inspector of Tests,
P. & L. E. R. R.,
3432 Allendale St.,
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Bancroft, A. G.,
Vice President,
P. H. Murphy Co.,
New Kensington, Pa.

Bandi, John E.,
Bill Clerk, P. C. & Y. R. R.,
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Barclay, J. R.,
Cost Engineer,
P. & L. E. R. R.,
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Barney, Harry,
President-Treasurer,
Barney Machinery Co., Inc.,
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Barnhart, B. F.,
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Barr, S. T.,
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Pennsylvania Railroad,
Pennsylvania Station,
Pittsburgh, Pa.

Bash, J. E.,
District Inspector,
R. R. Perishable Inspection Agency,
P.R.R. Produce Terminal,
Pittsburgh, Pa.

Batchelar, E. C.,
Manager, The Motch & Merryweather Mach'y Co.,
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Batson, J. F.,
Asst. Master Mechanic,
Pennsylvania Railroad,
Pitcairn, Pa.

Bauer, F. C.,
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Beam, E. J.,
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Beattie, J. A.,
1090 Shady Ave.,
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Beatty, Raymond N.,
Conductor,
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710 East Bell Ave.,
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Beaver, J. D.,
General Supt.,
P. S. & N. R. R.,
St. Marys, Pa.

Beaver, R. C.,
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Beeson, H. L.,
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Bell, D. H.,
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Bell, W. T.,
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Pennsylvania Railroad,
Pennsylvania Station,
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Beltz, J. D.,
Superintendent,
B. & O. R. R.,
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Supt. Motive Power,
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Berghane, A. L.,
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Wilmerding, Pa.

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Best, D. A.,
Test Engineer,
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Beswick, Richard M.,
Tester,
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Bier, C. D.,
Salesman,
Garlock Packing Co.,
Maloney Building,
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Pittsburgh, Pa.

Bingham, W. C.,
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Bingham Metal Co.,
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Bisi, Charles W.,
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Bittner, George,
Asst. Engine House Foreman,
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Blackmore, G. A.,
President & General Mgr.,
Union Switch & Signal Co.,
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Blair, John R.,
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Blest, Minot C.,
Chief Engineer,
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McKees Rocks, Pa.

Boden, A. S.,
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Coal Control Assn.,
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Oliver Bldg.,
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Bone, H. L.,
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Bonhoff, E. L.,
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Sewickley, Pa.

Booth, W. F.,
Asst. Superintendent,
B. & O. R. R. Co.,
B. & O. Station,
Pittsburgh, Pa.

Borg, John Edw.,
Chief Draftsman,
Julian Kennedy,
232 Martsolf Ave.,
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Bottomly, E. S.,
Chief Joint Inspector,
P. R. R., B. & O.,
Rdg. and W. M.,
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Bowden, T. C.,
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Boyd, J. W.,
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Bradley, Howard J.,
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Brady, T. Jos.,
President,
T. J. Brady Co.,
303 Kearsage St.,
Mt. Washington Sta.,
Pittsburgh, Pa.

Brahm, Donald P.,
Clerk,
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B. & O. Station,
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Brant, Wm. J.,
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N. S., Pittsburgh, Pa.

Braun, Otto F.,
Gen. Mach. Shop Foreman,
P. & L. E. R. R.,
R. D. 1—Herbst Road,
Coraopolis, Pa.

Brennan, John T.,
Vice President,
Greenville Steel Car Co.,
Greenville, Pa.

Brewer, H. W.,
Supt. of Shops,
B. & O. R. R. Co.,
Du Bois, Pa.

Brice, A. E.,
Special Representative,
Gulf Refining Co.,
Gulf Building,
Pittsburgh, Pa.

Bricker, O. F.,
Mgr., Transp'n. Advertising,
Westinghouse Electric &
Mfg. Co.,
East Pittsburgh, Pa.

Britt, T. E.,
Division Storekeeper,
B. & O. R. R.,
2818 Clermont Ave.,
Pittsburgh, (10), Pa.

Brown, C. C.,
Rep., Dearborn Chemical Co.,
618 Farmers Bank Bldg.,
Pittsburgh, Pa.

Brown, C. E.,
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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Official Proceedings of The Railway Club of Pittsburgh, published Monthly, except June, July and August, at Pittsburgh, Pa., for October 1, 1935.

STATE OF PENNSYLVANIA }
COUNTY OF ALLEGHENY } SS:

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared, J. D. Conway, Secretary, who, having been duly sworn according to law, deposes and says that he is the Editor of the Official Proceedings—Railway Club of Pittsburgh.

Publisher, Official Proceedings—The Railway Club of Pittsburgh.

Editor, J. D. Conway, 515 Grandview Avenue, Pittsburgh, Pa., (19th Ward.)

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Business Manager, J. D. Conway, 515 Grandview Avenue, Pittsburgh, Pa., (19th Ward.)

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Secretary, J. D. Conway, Pittsburgh, Pa.

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Known Bondholders—None.

J. D. CONWAY.

Sworn to and subscribed before me this 30th day of September, 1935.

[Seal] AGNES B. SHAW, Notary Public.

(My commission expires March 9th, 1939)