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Vol. XX JANUARY :: 1911 No. 4

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VOL. XX TERRE HAUTE, IND., JANUARY, 1911 NO. 4

THE TECHNIC

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OWING to the withdrawal from school at the end of this term of the present editor-in-chief, this issue of the TECHNIC will be the last issued under what may be termed, "the old staff," for the new editorial board will make quite a different appearance from the old. The new editor-in-chief, Erich A. Mees, '11, needs no words of introduction to the reader, for he has been a member of the staff during the past four years in the Locals and the Reviews departments. His work, also, as editor-in-chief of the 1911 MODULUS is sufficient recommendation, that the TECHNIC in the remaining issues of this year will maintain the high standard of the previous years.

To succeed to the place left vacant in the department of Reviews, David W. Johnson, '11, has been added to the staff. While entirely new in the journalistic field, Mr. Johnson's activity in the Institute work is indicative that the Reviews will be handled in a very capable manner. Richard Madison, '13, the present Sophomore Locals man, will undertake the dual role of Locals and Staff Artist. Madison succeeds Peddle, '12, who has withdrawn from the Institute to enter the business world, and from past evidences of his work, will prove all that an artist should.

In accordance with the established custom of electing after Christmas some representative of the Freshman Class for Local Editor, Walker Henry has been chosen. This is the last of the changes made in the editorial board and the rest of the staff remains intact.

In conclusion, the retiring editor wishes to express his thanks to the old staff for their efforts on the preceding issues and to wish the new editor and his staff the best of success in the succeeding numbers of the year.

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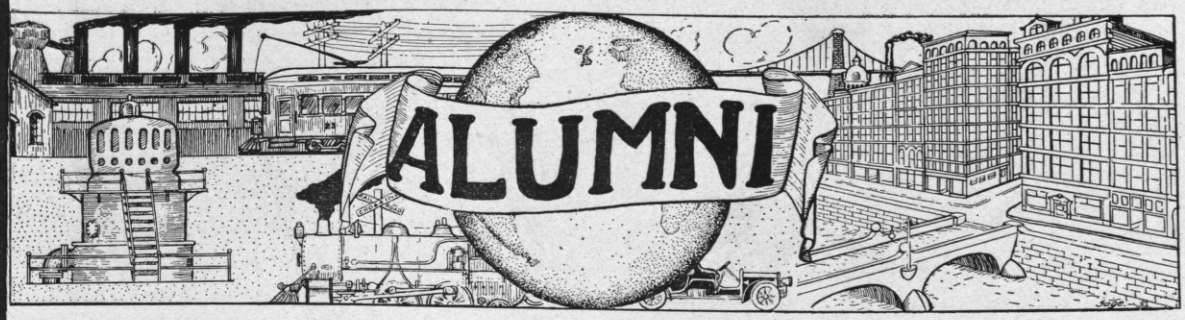
THE third of the series of lectures which have been planned by the various Rose Tech Clubs was given Saturday, January 14th, by H. W. Eastwood, '06, of the Pittsburgh Rose Tech Club. Mr. Eastwood is connected with

the Sales Department of the Electric Controller and Supply Company of Cleveland, Ohio, and, as Doctor Mess mentioned, "since this firm is distinctly a Rose institution, it is proper that we should hear from it." The talk was on "The adaptation of electrical machinery to the steel industry" and was illustrated by numerous slides showing not only what the lifting magnets and controllers could be expected to do and has done, but also, various diagrams interesting from a technical standpoint.

Thus far, the students have had the pleasu of listening to three of our own alumni on t various topics in which they have become i terested since leaving school. In addition, graduate of Cornell has given us a talk on t conditions and prospects of engineering in t South American field. All of these talks ha served to make the term's work far more inte esting and let us hope that we shall have t opportunity of hearing a number of speake this coming term.



LIFE IN A BOX-CAR

By R. F. Tyler, '09.

IF the editor had asked me for an article on "Life in a Box-Car" several months after my graduation from Rose, I believe that I could have done the subject greater justice for two reasons: first, I would have been fresher from the master tutorage of Professor Wickersham and would feel less shaky on my composition; second, at that time things seemed a great deal more novel and interesting to me than they do now since I have spent some twelve months in a box-car home. The editor evidently knew that I had been working at railway signaling for his instructions were that I was not to write a treatise on signal work, but only on the "life in a box-car." Wise editor, for it would have been so easy to conscientiously turn him down on the subject of signalling on the plea of inability, whereas, on the latter subject, my only plea is that I cannot put what I know in an attractive and readable form.

Most of my experience has been in camps of the signal department and perhaps a few words of general description of a typical camp may be interesting. It is intended to keep about forty men in each camp. For their accommodation is provided three bunk-cars, foreman's car, containing both sleeping accommodations and office room, dining car, kitchen car, and commissary car, which in addition to being used for the carrying of food supplies, also contains sleeping quarters for the cook. In addition are the tool and material cars, the number depending on the nature of the particular work on hand. Usually from ten to twelve cars make up the complete camp. The entire equipment is of little higher grade than the ordinary outfit-cars you may have seen along the tracks for use of the ordinary railroad laborer. The cars are ceiled inside with surfaced lumber, likewise the bunks and all was neatly painted, when new. It is possible, by use of your spare change for the purchase of various preparations and your spare time on Sunday to keep the superfluous inhabitants of the mattress and bedding under subjection for the next week, at least. However, at times, it is necessary to take rather severe measures with some fellow who, either from naturally inherited

laziness or because of lax ideals in the matter of personal cleanliness allows the representatives from his county to overrun the car.

One all-important requirement for a happy camp is to have a good "flunky," "crum-boss," or "bo-cook," you can take your choice for the title and, believe me, he was often called lots worse.

At any rate, he is the fellow whose duties are to sweep every day, occasionally scrub out the cars, make the beds, keep the water tanks filled, both for washing and drinking, in short, act as general handy man around the camp. The job may sound easy, but he generally has to stand more abuse than any other ten men in camp. The worst of it is that he must take it from all sides for every one around the camp seems to have enough authority to cuss the "bo-cook" and they seem to enjoy this authority on all possible occasions.

Another requirement is good "chuck," although I must say that in camps where I have been, the meals have been good the greater part of the time; but the cook that starts to economize either in quantity or quality will soon hear a mighty grumble from the men, and he must either come across with the goods or get off the job. The men are fully justified too, I think, for in the case of the laborer, the board consumes about half of the pay. The company in charge of the railway eating houses and hotels along the system also has charge of the commissary end in the camps.

It is hardly necessary to state that with the foreman lies a great deal of the opportunity of making the camp a happy one or not. It has been my good fortune to have worked under the best of foremen and the various camps have been, without exception, of the happy sort, but there are records of numerous camps that have failed in this regard due to the foremen in charge.

I wish that I were able to sketch for you in an interesting manner the character of men one meets with in these camps, for to me it has been a thoroughly enjoyable study. First, I will speak of the men in the signal department camps and later, of the typical railroader as I have had occasion to meet him. Of course, some of them are just such men as you are likely to meet anywhere, a few are college men and others who are in the signal work because they like it or see a possible future in it and are willing to stand some hard knocks and hard work that they might gain their end, the remainder are largely men who are picked up by employment agents and hired through the promise of easy and attractive work and a more attractive future. The latter class come on the work by the car load and the first day, perhaps with a pick and shovel, is enough for some of them to "beat it." Some of them are men who, according to their own stories, at least, were tradesmen and mechanics accustomed to good wages and ambitious to become signal men, but on finding that the realization of their ambitions along that line must start with calloused hands and aching backs at night, these same men are glad enough to get on their way back to "dear old Chi" as soon as possible. With each shipment usually come some who are "just traveling" and this certain job happens to be in the desired direction. This type, after accepting free transportation, often fail to even register at Hotel de Box-Car. Then there are those who for some reason or other are just "down and out," but who really have something in prospect and so come out to work long enough to get a little "stake" and make a fresh start. Then there is the class of men that comes on the job not caring how hard the work is because they are used to it. They perhaps have no particular ambition except to have something to eat, a place to sleep, and to save up enough money that when they quit they can buy an outfit of clothes, that is, if the dispenser of beverages in the first town does not get too much of the roll first.

My first working-partner was quite a character, "Blackie" was the name he went by.

"Blackie" was the camp favorite because of his ever pleasant greetings and the stories which he recited "from his own personal experience" to while away the leisure hours. His home was in Brooklyn and he had sailed the ocean to nearly all Central and South American and West Indian ports. He had crossed the continent several times and had, I judge, been in every state in the Union. It mattered not where a man came from, "Blackie" would always be able to prove he had been there by telling of some local incident or condition; no train, not even the Twentieth Century Limited, was too fast for him to ride the "blind" or the "top." He had a very fine education, was bright and as keen a man as you often meet, and if his energies had only been directed into proper channels, he would have been a top-notcher. However, a rainy day in a town where, if you but knew how to hold your mouth right and wink, the "cup that cheers" was purchaseable, would make me hunt a new partner the next day.

A trip to Texas was an interesting one to me inasmuch as the country was new and the conditions novel. I thought the negroes were about as plentiful and as worthless in Dallas and Fort Worth as it was possible for them to be, but I was told that in the southern part of Texas they were so thick that they made it so dark that it was necessary to carry a lantern around in the day-time. It was hard for me to realize that when I was in Dallas, I could go nearly as far in one direction across the state as it would be to go back to Chicago. One interesting side-light down there was a "convict camp" located just across the tracks from our camp at one place. The convicts were engaged in making a county road. All of them wore their striped jackets and were always heavily shackeled and guarded by men with six-shooters ready for action, and with blood hounds in close attendance ready to take the trail at any time.

In some respects, the last part of my box-car life has been the most interesting. There was some work to do on the signals in connection with the re-laying of new steel and it fell to me to have charge of the work for some months. We were right among the steel gang men all the time and I certainly enjoyed studying them. Among the eighty-five or ninety men were a good many of the real old-time railroaders who have helped in the building of railroads all over the country for the last thirty years. The accuracy with which these old-timers could handle the spike-maul was something admirable, but you cannot really appreciate it unless you have at some time tried to handle one of the unwieldly things yourself, but take it from me, there is some trick to it.

Nearly all of the men in such a gang as this one are of transient kind and when they get a couple of month's pay in their jeans, their feet begin to itch until they get to some place where they can immediately dispose of it as best suits their aims. I have seen some of them work for three months at that terribly hard work in the hottest weather, do their own washing, fix their own shoes, mend their clothes, and in fact, save a penny wherever possible; then, when they get their nice little stake made, beat their way to Chicago and in less than a week's time, be back on the job without a cent, but ready to start again. One of them said to me once, "It is whiskey that builds the railroads," and he was, to a degree, correct; for if it were not for whiskey, the men would have to work only about one-quarter of the time to earn enough to live on and the rest of the time the railroads would be without their labor; but as it is, they only lose a week or so every three months. Although these men call themselves "hoboes" they are not the kind you read about in the comic supplements, who live on what they can get from "hitting the back doors" and are scared to death of soap and water. These men pay for what they get by good, hard, honest work, only they give too much of it, as some of them jokingly say, "to the saloon keeper to buy silk dresses and diamonds for his wife." As to cleanliness,

there is never a Sunday goes by, but that, almost to a man, they wash every stitch of clothes they own, and they don't wash with cold water, either, but use "boil-up," as they call it. It is quite a sight to see them at it, each with his "boiling-up can" over a camp fire, for which they have gathered wood all the week, and soon you see the right of way fence decorated with a washing, which for thoroughness, would put many a laundry to shame.

To hear some of these old-timers talk, you might imagine that they were on the most intimate terms with the highest railroad officials in the country. They can call the full names of them all and give you some of the personal characteristics of each. They know all the big labor contractors and can tell you who has the contract for "feeding" for each railroad company or contractor and about the quality of "grub" you are likely to get from each.

Yes, a "side door Pullman" does seem pretty much like home to me now; and can you blame me very much if, at present, when I happen to be living in a stationary house, that when I hear the six o'clock whistle of the near-by power house, I just turn over, saying to myself, "Number Thirty must be pretty late this morning," and then roll over for another snooze, thinking that soon the flunky will come along pounding on the side of the car and calling "All out for breakfast." Or is it peculiar that when I half awaken by hearing some one rattle a lock, I brace myself in bed thinking that some brakeman is lifting the coupling pin at the end of the car and that the next thing will be a bump from the engine as they take hold of us to do some switching.

I hope I may be pardoned by the reader for making this so much of a personal article, but I am afraid that I would have made it even less interesting to have written any other way. I wish the article might be at least a fractional part as interesting as "Life in a Box-car" has been, for some of life's best lessons are to be learned and the most interesting of characters can be studied.

———ooo———

ALUMNI NOTES.

Martin W. Troll, '01, is now with the F. W. Spacke Machine Co., of Indianapolis.

———

Mark Dee Cory, '04, was married to Miss Esther Marguerite Arnold, of Oak Park, Illinois, on Dec. 22, 1910. The couple will be at home after the first of March at the Westminister, Winona Lake, Indiana.

———

By mistake, H. B. Sperry, '92, was reported as being with the Deering Harvester Co. He is with the International Harvester Co., at the Deering Works, Chicago.

———

Ray G. Jenckes, Jr., '05, has returned from Brazil, South America, where he has been located for the past year and is now in Indianapolis.

———

The following announcement was overlooked at the proper time, and as a consequence, appears at this late date:

Mr. and Mrs. Samuel Buchanan announces the marriage of their daughter, Amy Louise, to H. Edmund Wiedeman, '03, on Thanksgiving evening, nineteen hundred and ten, East Saint Louis, Illinois.

———

The stork has announced a baby boy, Howard Grossenbach Mullett, has taken up his abode at the home of H. A. Mullett, '04, Milwaukee, since December 8, 1910.

THE IMPROVEMENT OF OUR RIVERS

By H. C. Uhl, '12.

THE improvement of our rivers is receiving much attention today. It is an assured fact that the United States has more and better rivers than any other country and we are just now waking up to the fact that our splendid rivers need improvement and that, by proper means, they may become a very valuable asset to our country's resources.

Several decades ago, in the 50's to the 80's, there was a great river commerce on our large rivers. This was especially true of the Mississippi and Ohio rivers. Today this great river traffic has greatly decreased. A few figures will serve to show the decrease.

The total tonnage for entire Mississippi system for 1889 was 28,289,000 tons, as against 19,531,000 tons in 1906.

Thus the river traffic has diminished greatly, while the railway traffic through the same territory has greatly increased.

The chief causes for the decline of this once great traffic are *the lack of improvement of the rivers* and *the rapid growth of the railways.*

I will consider, first, the question of the decline of water traffic due to the railroads and will take up the decline due to lack of improvement later.

A railroad can be constructed in any direction and branch lines and switches may easily be extended for the convenience of factories and warhouses.

It is evident, that the course of the river is fixed and that such conveniences as are given by the railroads cannot be given by the rivers.

Railroads reach all towns alike, whether on a river or not, and thus, it is not necessary to depend upon a river for connection with the outside world. Very good examples of these are the following cities: Birmingham, Ala., Atlanta, Ga., Denver, Colo., Columbus, Ohio, and Indianapolis, Ind. Another great advantage of the railway over the river is in the more convenient loading and unloading facilities which the railroad offers, also in the quicker and more

economical transfer of freight from railroad to railroad, than from boat to railroad. The cars containing the freight are simply switched from one railroad to another, without unloading. In the case of the transfer from boat to railroad, the freight must be unloaded on the river bank and then carted to the railroad and reloaded. This causes a loss of time and an additional expense.

A railroad often charges lower rates in many places where there is competition with a water route. Owing to the quicker time made by the railroad the trade is given to them. In this way the water lines are forced to give way to their commercial rivals.

Another scheme often followed by the railroads is either to purchase the steamboat lines or to enter into certain agreements with them. This is known as "stifling" water traffic.

Another advantage of the railroad over the river route is in the more constant shipment of freight, as often times the rivers are too low for navigation.

In recent years, the railroads have been congested with traffic at certain seasons, and it will soon be necessary to use the rivers for the accommodation of this greatly growing traffic. Before the rivers can be used to advantage, however, they must be improved.

It is certain that transportation by river is much more economical than transportation by rail, but the present condition of the rivers make it impossible to take advantage of this economy.

The average cost of carrying a ton of freight on the Ohio river, including the return of the empty barges, is but one-third (1-3) of a mill per ton-mile. The cost, by rail, per ton-mile, varies from several mills to several cents.

The saving for one year in rates, if all the freight were shipped by water instead of rail, would pay the entire cost of improving the rivers. It is evident, then, that the rivers are worth improving.

The government now provides for the removal of snags from rivers, straightening and deepening of channels, the building of dykes to divert the channels, and the lighting of the channels by pilot lights, but none of these prevent the variation in the depth from very low to very high water.

Low water may be prevented in the Mississippi river by proper dredging, as the fall is gradual. The dredging must be frequent, however, as the sediment soon fills up the channel.

In the lower Ohio, dredging may be employed but in the upper Ohio, where the fall is greater, canalization is necessary. This scheme of canalizing the rivers has been successfully employed in England, France, Germany and Belgium. Our own government has formulated a plan, upon which it is now working, to canalize the Ohio river. The plan consists of the construction of 54 movable dams in the Ohio, from Louisville to Pittsburg. This will give the Ohio river a minimum stage of nine (9) feet, even in times of drought. The cost of this improvement will be in the neighborhood of $75,000,000 and it will be completed in 12 years. As has been noted, the dams will give the Ohio river a minimum stage of nine feet; for stages of the river above nine feet the dams will be useless and for this reason they are made movable. Also, in times of severe cold, there is danger from the ice, which often "gorges" in the Ohio and causes damage. These ice gorges would destroy the dams and for this reason, also, they are made movable.

All of these dams are constructed so that they may be lowered to the bottom of the river. The dams are made in sections, and each section (from 2 to 3 feet in width) can be lowered separately when the water rises above nine feet. The sections are usually made of wood and have a device which allows them to be lowered and raised easily. A small boat is used to lower the sections. When the stage of the river falls below nine feet, all the sections are raised. The device with which they are equipped allows of their being raised, not against the current which

would be quite difficult, but *with* the current. They are then allowed to drop in place by means of the current. This simplifies their manipulation and allows them to be quickly placed in position again. There is an ordinary lock on one end of the dam, which is used in the ordinary way when the dam is in place. It is very difficult to explain the manner of manipulation of the movable dam, but it is really a very simple way of overcoming the difficulties encountered in a river which varies greatly in height.

The Fernbank dam, just recently completed in the Ohio river near Cincinnati, Ohio, is the largest movable dam in the world. Its cost was about $1,500,000. It creates a lake about 28 miles long, having a minimum depth, in the channel, of nine feet. Of course, the dam will have to be higher than nine feet to accomplish this. The dam forms a harbor for Cincinnati and is one of the chain of 54 to be constructed. Twenty-eight miles above this another will be constructed. Farther up-stream the dams will have to be closer than 28 miles.

The improvement of the Ohio will mean the development of a great inter-state trade as it will open the Ohio Valley states to the commerce, by water, of all parts of the world. It will give to the Ohio river an economic value not to be reckoned in dollars, establishing as it does one of the greatest commercial inland waterways in the world. It will greatly increase the wealth of the Ohio Valley and tributary sections, in that it will increase transportation facilities, for both raw materials and manufactured products. It will stimulate commerce and manufacture to a remarkable degree by providing a continuous and inexpensive means of carrying products to markets hitherto only partially or not at all directly accessible to the industries of the Ohio Valley.

At present, great coal fleets in the Ohio river wait at the mines at the headwaters until there is a rise in the river and then they start out with their millions of tons of coal. The delay in starting often causes coal shortage. With the construction of the dams, these coal fleets may move at any time and the coal and freight may be delivered on time and at a very low cost.

Another very valuable asset to our country's transportation facilities will be the construction of the "Lakes to Gulf project." This has been greatly helped by the construction of the Chicago Drainage Canal, but much is still to be done before it is possible for this route to be used. The plan is to deepen the drainage canal, dredge the Illinois river and build a few locks where needed. This will probably be completed, in fact, it *must* be completed soon. This will mean that freight may be shipped from New Orleans, or Pittsburg or St. Louis or even Minneapolis to Chicago, Milwaukee, Cleveland, Buffalo and any of our lake ports. Freight may even be shipped to New York, through the Erie Canal and the Hudson river. All this may be accomplished without reloading the freight.

This "Canal" route will greatly supplement the railroads and is certain to lower the freight rates existing at the present time.

In order to make the rivers more efficient as carriers of freight and to prevent the great damage caused by floods it will be necessary to regulate the flow of the rivers. In years past, the rivers were more regular in their flow than now. In March, 1908, the stage in the Ohio river at a certain point (Portsmouth, O.) was 62 ft. In October of the same year it was about one foot. Of course, this was an exceptional year, but variations of 60 feet are becoming more and more common.

The object of the improvement of the rivers is to eliminate the high water and the low water and to cause a more uniform flow. The low water may be eliminated by the methods of dredging and canalization. The high water problem is very difficult to solve. Each flood, (and sometimes several occur in exceptional years), causes millions of dollars of damage to the cities which they flood. They also cause an untold amount of suffering and are a great inconvenience to the people in the flooded districts

occurring, as they do, usually in February or March.

The floods also cause an enormous amount of soil to be carried away. It has been estimated that each year nearly one billion tons of the best soil is carried into the Atlantic, the Pacific and the Gulf of Mexico by our rivers alone.

By the above examples it is readily seen that water, when uncontrolled, becomes quite a destructive agency.

Various schemes have been used for the prevention of damage by floods, such as the construction of levees, flood walls, dykes, etc. These, however, do not prevent the floods.

The chief cause for the increasing number of floods, of late years, is the destruction of the forests. The leaves and vegetable matter of the forest regions act like a sponge and hold the rain when it falls and then permit it to flow gradually into the streams. When these forests are removed the water, as it falls, rushes directly into the streams, carrying vast amounts of the best soil with it. None of the water is held back: the consequence is a great flood at one time of the year, and a very low stage of the river at another time. A solution of this problem is the reforestration of the headwaters of our streams. This seems quite a task, but it is a possible one.

Some people may say that there were floods before the forests were destroyed. This is true, but floods were quite rare. In 1883 and 1884, however, there were destructive floods in the Ohio river. These were quite exceptional, however, and were due to the sudden melting of heavy snows in the mountains by continued heavy rains.

The floods now occur in very much greater numbers and much more regularly. The low stages of the rivers are also much more common. It is evident, then, that the forests really do regulate the flow of the streams.

Another plan suggested to regulate the streams is the construction of immense reservoirs in the headwaters to store up the flood waters and to prevent the low stages of the rivers by its use in times of drought, which is practically every summer. Such storage reservoirs have been and are being used to store up the flood waters in the western part of our country in order to use the water for the reclamation of the arid lands. Much land has been reclaimed by this method.

A noteworthy feature in the construction of storage dams is the vast amount of water power which may be developed. This, of course, could be converted into electrical energy and be transmitted for many miles. The question of a fuel shortage within the next few centuries causes the utilization of our streams, for power purposes, to take quite an important place. It is certain that our coal supply cannot last forever and that, at the present rate of consumption, it will soon be exhausted.

A conservative estimate of the power that is capable of being developed by our streams (considering the whole United States) is placed at 200,000,000 Horse Power. It is readily seen that this is not such a small figure and that there is much to be expected from our streams. It has been estimated that there is now about 2,000,000 H. P. actually going to waste over government dams.

It seems that with such possibilities, our streams should be taken better care of and improved and used. The improvement is sure to come, as it will soon be an actual necessity.

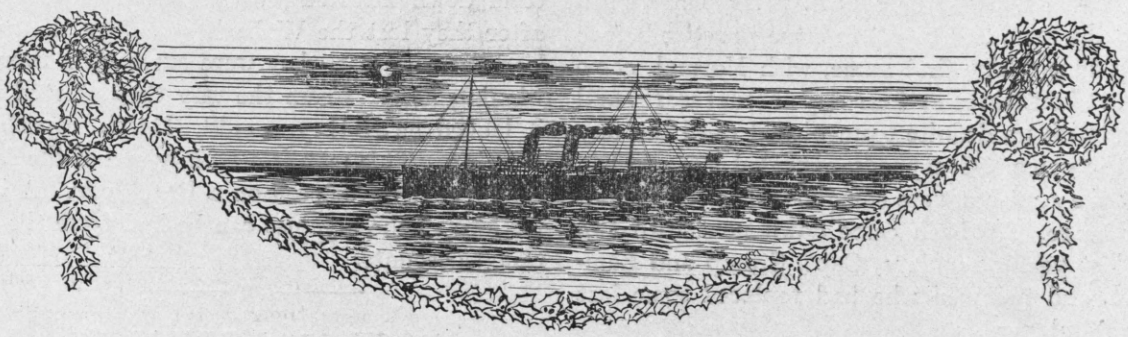
Another way that our rivers need improvement is in their sanitary condition. At the present time, the rivers are used as a cess-pool and all the sewage of the cities along the banks of the rivers and their tributaries is allowed to flow into them. This is a menace to the health of the people who inhabit the river towns, and who use the rivers for their domestic supply of water. Many people use the raw river water without any previous treatment, for many waterworks pump the river water into the city mains without filtration or purification. Is there any wonder, then, that there are such

severe epidemics of disease at times, especially of typhoid fever?

Most cities are now building or have built, plants where the river water is filtered and purified before being used for domestic purposes. Even though these plants do exist, that is no reason why the sewage and filth of our towns and cities should be allowed to pollute our streams. Some provision can be made for getting rid of it or, at least, disinfecting it before it is allowed to flow into the streams.

From the statements that have been made, it is very evident that there is a great necessity for the improvement of our streams. Their improvement would give a cheap means of transportation of freight; it would give a great source of power, with very little cost for maintainance; their improvement would aid irrigation and would give us a better supply of pure water for domestic and manufacturing purposes. Our streams will not be improved, completely, until they are made navigable for large boats throughout the year; not until freight may be shipped to all parts of the country by the canalization and uniting of our streams; not until they are made more sanitary and the sources of contagious diseases eradicated, and not until all the power, which they are capable of producing, is being produced.

These improvements must be made and it is to be hoped that they will be made soon, for our rivers will not be improved (in the true sense of the word) until they are doing all that may be reasonably expected of them.



TWO victories and one defeat is the record of the basket ball team this month, a rather good one for a new team, that is, with the exception of one man. Captain Hoffner was the only veteran to start the season and it was up to him to get a team into shape before Coach "Spot" Hadley came, Jan. 4. The inter-class games gave him a starter and it was the men that starred in these games that were picked to form the squad. This work fell entirely on Hoffner's hands as Coach Hadley could not get here until after Christmas, and the team had to get in some practice before that time. The first game, with Normal, came after about three or four days actual work, and then with no definite team picked until the day of the game. Everybody expected Rose to win but the students were somewhat skeptical about the score. Wabash came down next with two of last year's regulars, Capt. Stump and Lambert, and two men who had replaced some last year's players.

Schemmler, center, and Herron, forward, were two Crawfordsville high school players, and when they entered Wabash this year they beat Ebert, center, and Leffel, forward, out of their places. It certainly looked blue for Rose, especially as the strength of our team was unknown, but the result was all right. If the team keeps on improving as it has been there is a chance, but only a chance, that we may win at Crawfordsville. Although team work was not first rate, in the Michigan Aggie game, there was a big improvement over the Wabash game. Wabash beat the Aggies by a ten point score and Rose beat them by a six point score, besides overcoming a strong determination on their part to win.

Captain Busch, of the Aggies, was down here last year and took part in two defeats, one at Wabash and one here. This year he brought a team down intending to win both games, and after they lost the Wabash game, by the same lead as Rose lost, they were surer than ever of winning here. From the way they started out it looked as if they would, Busch especially starring. This man is certainly one of the fastest forwards ever seen on a Rose floor. A better idea of these games can be had from the detailed accounts.

———ooo———

ROSE 47—NORMAL 16.

Seven men got into this game for Rose and all covered themselves with glory, especially the three forward men who threw baskets almost at will. Normal was not in it at all. Some say they thought they would win, because they beat the Danville Central Normal School by a large score, but everything went Rose Poly. Capt

Bowles and Knox put up good games for Normal, especially the former. He worked the ball out from under Poly's basket many times, but once out, there was no one to keep it there.

Poggensee and Kelley, the two freshmen, showed good form, the latter getting eight field goals. Captain Hoffner played his first game in his new position, forward, and was perfectly at home. The first half ended 25 to 5.

The line-up:

Rose Poly.	Position.	Normal.
Hoffner (Capt.)	F.	Knox
J. Kelley	F.	Asbury, Bird
Gray	C.	Demaree
Offut, Deming	G.	Bowles, (Capt.)
Poggensee, Crowe	G.	McCullough

Summary—Field Goals—Gray 8, Kelley 8, Hoffner 6, Demaree 2, Knox 2, Asbury, Offut. Foul Goals—Bowles 4, Hoffner 1. Referee—Westover, of Purdue.

———ooo———

WABASH 30—ROSE 20.

The Little Giant's ability to score from all parts of the floor put them in good stead in this game, and when Schemmler and Eglin would take shoots from difficult angles and get by with them, our fellows were helpless. For fifteen minutes in the first half, Rose more than held her own, and was in the lead part of the time, the score finally standing 16 to 13 in favor of Wabash at the end of the period.

In the second half we did not score a field goal, Hoffner's seven foul goals being the only redeeming feature. It was in this half that Eglin came into the limelight. He was only a little fellow but he was mighty, and he dropped in four field goals from hard shots. Gray was the only man who could score for Rose and it was by individual playing as the team could not pass the ball owing to the excellent guarding of the visitors.

The line-up:

Wabash.	Position.	Rose Poly.
Herron	F.	Hoffner, (Capt.)
Eglin	F.	J. Kelley, Offut
Schemmler	C.	Gray
Stump (Capt.)	G.	Poggensee
Lambert	G.	Crowe

Summary—Field Goals—Schemmler 5, Eglin 4, Herron 2, Lambert 2, Gray 3, Kelley, Poggensee. Foul Goals—Hoffner 10, Lambert 4. Referee—Reiman, of Purdue.

ROSE 26—MICHIGAN AGGIES 20.

This was a great game, one team trying to show that they were as good as their school's last year's representatives and the other trying to redeem a last year's defeat. The former came out on top by winning. The first half was hard fought, neither team being able to score much, the count being 9 to 7 in Rose's favor at the end.

The second period started off with a rush and Rose ran up a lead of 17 to 9, but about this time Chamberlain was disqualified by the four personal foul rule, and Bateson who took his place came near causing a disturbance. In the ten minutes he played he shot three baskets, all after working the ball the length of the field, and his play seemed to give new life to his teammates. Busch also slipped in a basket about this time, but Offut added two field goals to Rose's credit and Gray and Poggensee each one and cinched the game. In the second half Capt. Hoffner hurt his knee, Deming taking his place. This combination weakened the team somewhat and may have been responsible for the Aggies spurt as Hoffner was putting up a great game. Crowe was strong on his guarding in this game.

The line-up:

Rose Poly.	Position.	Aggies.
Hoffner (Capt.) Deming	F.	Busch (Capt.)
Offut	F.	Hoff
Gray	C.	Chamberlain, Bateson
Crowe	G.	Duthie, Goss
Poggensee	G.	Hanisb

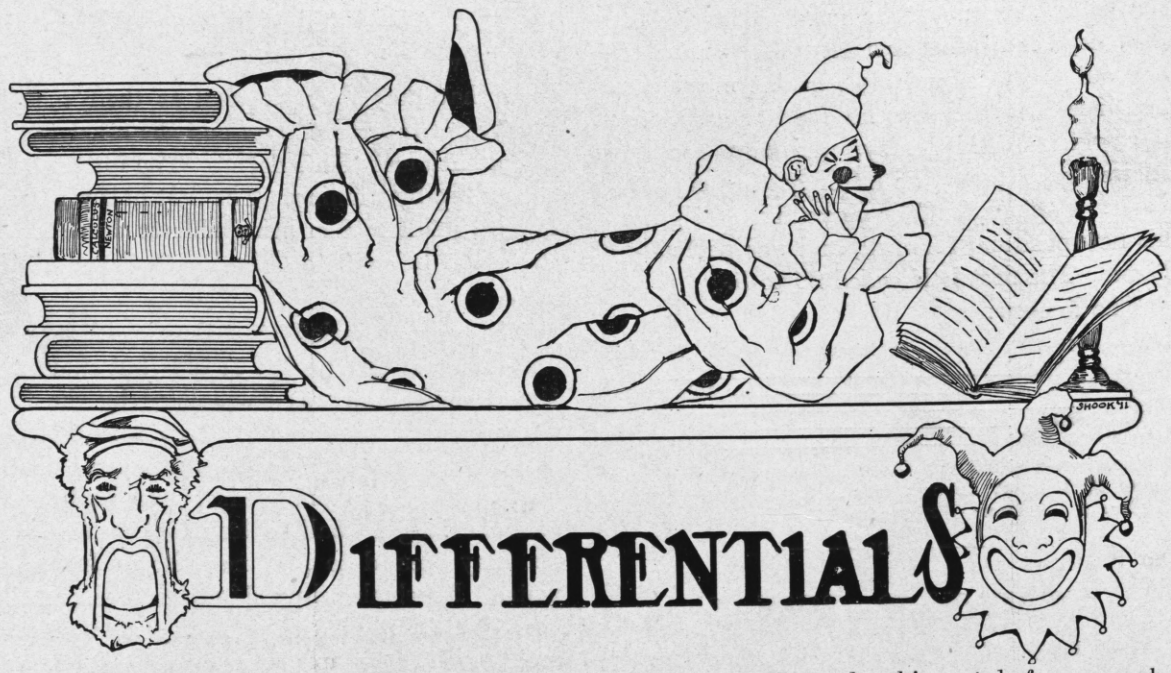
Summary—Field Goals—Gray 6, Offut 2, Hoffner, Poggensee, Busch 3, Hoff 2, Bateson 3. Foul Goals—Hoffner 5, Offut, Busch 4. Referee—Guedel, of Indiana.

———ooo———

INDIVIDUAL RECORDS.

	Field Goals.	Foul Goals.	Total Points.
Gray	17	....	34
Hoffner	7	16	30
Kelley	9	....	18
Offut	3	1	7
Poggensee	2	....	4
Crowe	....	....	....
Deming	....	....	....
	—	—	—
Totals	38	17	93

Rose 93—Opponents 66.



Nick—"Blondie, did you make any New Year's resolutions?"

Blondie—"Naw, Doc drew some up and I O. K.'d them."

* * * *

Hath, after a five minute lecture on the evils of swearing—"Now, when you want to say an expressive word—"

Kelly—"Say 'damn.' "

* * * *

Stephenson—"What's valence, Levi?"

Levi—"Never heard of that."

* * * *

For the correct pronunciation of the word "reciprocal," see Brennan, '13.

* * * *

Father—"Willie, this hurts me more than it does you."

Up-to-date Child—"Corporal punishment is surely sufficient indignity; kindly spare the insult to my intelligence." —Ex.

Thomas—"You take this metal, for example. The cooler it gets, the colder it becomes."

* * * *

Professor Elmer H. Willmarth—"A hole is never smaller than the drill that made it."

* * * *

TYPICAL.

Heppner—"Can you tell me the difference between a synchronous motor and a what (watt) is?"

* * * *

Mac—"Mr. Voelker, I wish that you would look this way during the recitation. In other words, keep your eye on the dome of the administration building."

Heinie Ker—"We can see the dome, all right."

* * * *

A certain young (?) professor recently presented his wife with a handsome piano lamp. He was much flattered when she told him to give it his name, until he asked the reason for so peculiar a proceeding.

"Well," she said, "you know, dear, it has a good deal of brass about it, it is handsome to look at, requires a good deal of attention, is remarkably brilliant, is sometimes unsteady on its legs, liable to explode when only half full, flares up occasionally, is always out at bedtime, and is bound to smoke."

* * * *

Young Lady (at Senior reception)—Mr. Werst, do you know my friend, Mr. Heppner?

Mr. Werst—Why, yes! He and I sleep in the same class.

* * * *

Tommy—"Pop, what is ennui?"

Tommy's Pop—"Ennui, my son, is a disease that attacks people who are so lazy that they get tired of resting." —Ex.

* * * *

"Here, Tilley, what's the matter? You look worried."

"Work—nothing but work from morning till night."

"How long have you been at it?"

"I begin in June."

* * * *

A city chap went to work for a farmer out in one of the western counties of Kansas. At 3 o'clock the next morning, the farmer called to him to begin the day's labors. A few minutes later the young man came out of the bedroom carrying his grip.

"You ain't a-goin' to take that grip with you to work, air you?" asked the farmer.

"Naw," answered the man with a fine scorn, "naw, but I'm goin' to find a place to stay all night!" —Ex.

* * * *

Doc White—Are you sure that's right, Mr. O'Laughlin?

Slim—I'm not so sure that it is right, but that is what you told us.

Thomas (confiding to class in Water Supply)—Now before I came here this fall, I had been drinking snow water, but the water in Terre Haute is so hard that I could not drink it at first. I had to live on milk and beer.

* * * *

"Why don't you go to the dance tonight, Harold? Haven't you any flame?"

"Yes, dad," said the Harvard student, "a flame, but no fuel."

* * * *

Smith has a lovely baby girl,
The stork left her with a flutter.
Smith named her Oleomargarine,
For he hadn't any but her. —Ex.

* * * *

McCormick—The examination will be without books.

McDaniel—Oh, mercy!

McCormick—No, without mercy!

* * * *

Brewer (translating *de sorte qu'en cas d'incendie*)—A kind of incandescent gas.

* * * *

Charles—"When I asked her to be mine, she put her arms around my neck and whispered that she was so happy."

Amy—"Yes, that is what she told me she was going to do; and, what's more, I happen to know that she has been practicing it with Cousin Tom for ever and ever so long."

* * * *

"Why don't you put that college son of yours at a trade?"

"What could I trade him for?"

* * * *

Krieger—Dearest, will you share my lot?

Dearest—Say, kid, on the square, ain't you got no home?

Hath—What rule do we use here?

Kelly—Let the people rule.

* * * *

A colored man was brought before a Police Judge charged with stealing chickens. He pleaded guilty and received sentence, when the judge asked how it was that he managed to lift those chickens right under the window of the owner's house when there was a dog in the yard.

"It wouldn'd be no use, Judge," said the man, "to try to 'splain dis thing to yo' all. Ef you was to try it you like as not would git yo' all's hide full of shot an' git no chickens, nuther. Ef yo' wants to engage in any rascality, Judge, yo' better stick to de bench, whar' yo' am familiar." —Ex.

* * * *

Queen (at 12:30 A. M.)—And would you really put yourself out for me?

Bud—Indeed I would.

Queen—Then do it—I'm awfully sleepy.

* * * *

Clore—Hepp, if you should accidentally swallow some nitric acid, what would you take?

Heppner—A ride.

* * * *

Who called our Professor Thomas "a dam surveyor?"

* * * *

Adams (in French)—A hygrometer is an instrument to tell how much atmosphere there is in the air.

* * * *

Hath—Now, I consider that you all are my boys.

Novotney—Give me a nickel, dad.

A workman, endeavoring to explain to one of his mates what a phenomenon was, made the following attempt.

"It's like this: Suppose you were to go out into the country and see a field of thistles growing."

"Yes," assented his friend.

"Well, that would not be a phenomenon."

"No, that's quite clear," argued the other man.

"But suppose that you were to see a lark a-singing 'way up in the sky."

"Yes."

"Well, that would not be a phenomenon, either."

"No, that also seems clear."

"But imagine there is a bull in the field."

"Yes" his friend would imagine that.

"Even that would not be a phenomenon."

"No."

"But now, Bill, look here. Suppose you saw that bull sitting on them thistles whistling like a lark—well, that would be a phenomenon."

—Ex.

* * * *

A sea captain and his mate went ashore on getting into port and made for the nearest restaurant.

They ordered soup; when it arrived, the captain examined the curious looking fluid and shouted: "Here, waiter, what d'ye call this?"

"Soup, sir," said the waiter.

"Soup," said the captain, turning to the mate, "blame me, Bill, if you and me ain't been sailing on scup all our lives and never knowed it." —Ex.

NEW RAILWAY CONSTRUCTION IN 1910.

THE new railway built during the past year in the United States is greater than that for the previous year. This is quite a satisfactory showing, as financial conditions have not got sufficiently improved to induce investors to back new projects, and uncertainty as to the prospect of future traffic has caused the suspension of work already started and prevented other plans for new work being carried out. Official returns from nearly all the railways in the United States supplemented by records furnished by the state railway commissions, show that approximately 4,122 miles of new main line were built in the United States during 1910, as compared with 3,748 miles during 1909. The 1909 record was over 500 miles more than for the preceding year, which was the smallest since 1897. These figures include 63 miles of cut-offs in Wisconsin, on the Chicago division of the Minneapolis, St. Paul & Sault Ste. Marie, but they do not include new second, third or fourth track, sidings or electric lines. The actual increase over last year amounts to about 10 per cent.

Many of the larger railways which are included in the list have only added new mileage for work started the previous year, and with a few exceptions no new work of importance has been started. Considerable progress was made during the year in making permanent improvements to roadbed to carry heavier rolling stock, straightening alinement and reducing grades. Many of the strongest railways have reduced construction to the minimum.

On the cut-off which the Atchison, Topeka & Santa Fe is building between Texico, N. Mex., and Coleman, Tex., which is to have a total length of 310 miles, there was completed a section of 160 miles between Lubbock and Coleman. This was the longest single stretch of new road built. The Chicago, Milwaukee & Puget Sound added the largest amount of new mileage, having built 72 miles in Idaho, 93 miles in Washington, 132 miles in South Dakota and 124 miles in North Dakota, a total of 421 miles. The Santa Fe is second with 100 miles in California and 298 miles in Texas. The Northern Pacific built 236 miles.

In Canada, the Grand Trunk Pacific built 335 miles, and on the eastern end the National Transcontinental built 437 miles, a total of 772 miles. On the western end work is under way on 1,163 miles of main line and branches, and on the eastern end on 807 miles. The Canadian Northern added 484 miles in the western provinces of Canada, and revision work was carried out on a section of 11 miles of main line. This company is now at work on 76 miles in Manitoba, 283 miles in Saskatchewan, and 221 miles in Alberta, a total of 580 miles. The Canadian Northern Ontario added 75 miles of new mileage, and now has work under way between Toronto and Ottawa, on 258 miles; also on a 30-mile section between Gowganda Junction and Port Arthur, which are 500 miles apart. This line is being built to connect the eastern lines in Ontario with the western lines

at Port Arthur, and will form part of the through route to the Pacific coast. The Canadian Pacific laid a total of 367 miles, and work is now under way on about 263 miles.

In Mexico, the Southern Pacific added 41 miles, has work under way on 33 miles additional, and has located the line from Tepic to Madgalena. Particulars of the work being carried out by that company were given in our issue of last week. The National Railways of Mexico added 22 miles and has work under way on 64 miles additional.

New main track mileage is reported in 38 states and territories, including Alaska, where 61 miles of new track were built. Texas, which was first in 1909, was first this year, with 756 miles; Washington and North Dakota come next in order, each with over 300 miles; Idaho Minnesota, Oregon and South Dakota built between 200 and 300 miles each; California, Oklahoma, Montana, North Carolina and Arizona, in descending order, also built over 100 miles of main line in 1910. The largest decrease was in Nevada, where only 12 miles were built, as compared with 303 miles in 1909; nearly all the mileage added in that state last year was built by the Western Pacific, which is now open for traffic. No new mileage was reported in Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, Nebraska, New Hampshire, Ohio, Rhode Island, Utah, or Vermont. In Canada, 1,844 miles were reported, as compared with 1,488 miles in 1909, an increase of 356 miles, and in Mexico only 138 miles were reported, as compared with 281 miles the previous year, a decrease of 143 miles. The following table shows our figures for mileage built in the United States during the last 18 years.

1893....3,024	1899....4,569	1905....4,388
1894....1,760	1900....4,894	1906....5,623
1895....1,428	1901....5,368	1907....5,212
1896....1,692	1902....6,026	1908....3,214
1897....2,109	1903....5,652	1909....3,748
1898....3,265	1904....3,832	1910....4,122

—*Railway Age Gazette.*

TESTS TO DETERMINE STRENGTH OF SHAFTS WITH KEY-WAYS.

BULLETIN No. 42 of the engineering experiment station of the University of Illinois records the results of tests made to determine the relative strength of solid shafts and those with keyways. The sizes of the shafts tested varied from 1¼ in. to 2¼ in., and for each size the weakening effect of key-ways of different proportions was determined. The shafts were tested in simple torsion and also under combined twisting and bending. The proportions of the key-ways used corresponded with common practice, in which the width is ¼ the diameter of the shaft and the height of the key ⅛ of that diameter. In nearly all shafts tested the total length of the key-way was about four times the diameter of the shaft. Shafts were also tested with the key-ways for the Woodruff system of keying, but the results do not show any material difference between them and the plain keys. The average efficiency of shafts with the plain key-ways was .85, and that with the Woodruff system .845, efficiency being defined as the elastic strength of the shaft with a key-way divided by the elastic strength of the shaft without a key-way. The test resulted in the determination of an equation for the efficiency of a shaft with a key-way, which is represented as follows:

$$e=1-2w-1.18h$$

where e equals the efficiency of the shaft with a key-way, w equals the width of the key-way divided by the diameter of shaft, and h equals the depth of the key-way divided by the diameter of the shaft. It is explained that the equation should not be used for shafts much beyond the sizes of those used in the experiments. A diagram is also given which affords a convenient graphical method of applying the formula. Incidentally, the properties of cold rolled shafting in regard to strength and stiffness were determined, and the average value of the modulus of elasticity in shear (torsion) of cold rolled steel

shafting was found to be 11,985,000. The elastic limit in torsion of cold rolled steel shafting was 38,940 lbs. The final results of the tests are given in a table showing the power which can be transmitted in torsion by cold rolled shafting at 100 r. p. m. from 1 in. to 2½ in., varying by 1-16 in., with key-ways of usual proportions and when the shafting is stressed to the elastic limit. For example, a 1 in. shaft when stressed in torsion to the elastic limit will transmit at 100 r. p. m. 9.5 h. p.; 1½ in. shaft will transmit 32 h. p.; 2 in. shaft will transmit 75.9 h. p.; 2¼ in. shaft will transmit 108.2 h. p., and 2½ in. shaft will transmit 148.3 h. p. In this table no allowance is made for bending action, and as the steel is worked to the elastic limit a suitable factor of safety should be used. Copies of Bulletin No. 42 may be obtained by applying to W. F. M. Goss, director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

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LOSS IN COAL DUE TO EXCESS OF AIR.

IN *Power*, Vol. 32, No. 41, Mr. H. J. Westover presents an easy and reliable method of computing the amount of money lost in burning coal with an excess of air. The proper amount of air for complete combustion is of utmost importance in economical firing. The method employed by the writer is the determination of the air required in burning a fuel whose chemical composition with respect to carbon and hydrogen content is known, to form the products of combustion viz. carbon dioxide and water. All other products of combustion are neglected in the calculations as not being of sufficient importance to affect the results.

Taking as the average composition of soft coals in use throughout the United States, 94 per cent. carbon, 6 per cent. Hydrogen, with an ash content of 10 per cent., and starting with 110 lbs. of coal, it is an easy matter to determine the weight of the gases going up the chimney and the percentage of space occupied by each gas.

Making these calculations, Mr. Westover finds that the percentage of carbon dioxide for complete combustion will be about 18 per cent. of the flue gases for a given volume. Since the products of combustion vary inversely as the percentage of CO the excess volume of air for any given percentage of CO is readily determined. Thus, for 6 per cent. of CO per unit volume of flue gases, an excess of over 33,000 cu. ft. of air will be consumed. To heat this air from a temperature of say 70 to 525 (the temperature of the flue gases) 230,000 B.T.U. will be required or, approximately, it will take 21 lbs. of coal to provide this additional heat. This represents a loss of nearly 20 per cent. of the original 110 lbs. of coal. On this basis Mr. Westover has computed the following table to show the loss in percentage of heat against the percentage of CO , also the amount of money annually lost where the yearly coal bill is $1,000.

Loss Due to Incomplete Combustion.

Percentage of CO_2	Loss Per Cent.	Loss Dollars.
14	No Loss	....
13	1.5	15
12	2.5	25
11	4.5	45
10	6.0	60
9	8.5	85
8	11.0	110
7	15.0	150
6	19.5	195
5	26.5	265
4	32.0	320
3	53.5	535

NEW SYSTEM OF TRAIN DESPATCHING ON THE GRAND TRUNK RAILWAY.

THE Grand Trunk Railway System has recently placed in commission on their Northern Division, two telephone train despatching circuits. One circuit between North Parkdale Junction and Burlington Junction, via Allandale, a distance of 145 miles, and another circuit between Allandale and Nipissing Junction, a distance of 165 miles. Train Despatchers on each of these circuits are located at Allandale.

On the circuit between North Parkdale Junction and Burlington Junction there are twenty-one way stations, and on the circuit between Allandale and Nipissing Junction, twenty way stations. These circuits are constructed of No. 9 gauge hard drawn copper wire, transposed at intervals of every half-mile through the open country and as much more frequent as is necessary in the vicinity of high voltage power lines, in order to avoid inductive influences and to render the telephone circuits absolutely quiet. The station equipment consists of a swinging arm transmitter and head band receiver for each way station, thus giving the operator the free use of his head, hands and body while using the telephone; the apparatus is swung to one side out of the way while not in use. The Train Despatching office is equipped with a selector system for calling offices, and the duration of the ring in each way station is controlled by the Despatcher, who plainly hears the ring through his receiver. Any office on the line can be signalled within eight seconds, the signal bell in each office consists of a four-inch gong. The Despatcher has absolute control of the circuits, and way stations must obtain his co-operation when desiring to communicate with one another.

—*Canada West Magazine.*

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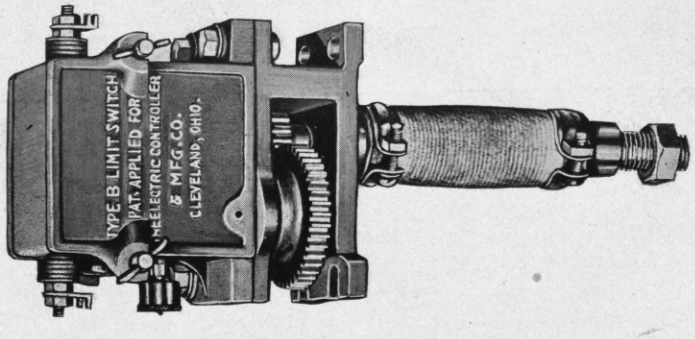

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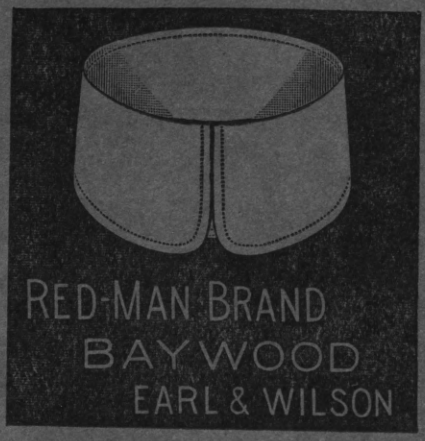

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