THE RAILROAD GAZETTE.

All machinery used for this plant is made for The cost of direct current working at 110 volts. maintenance of the entire plant since its installa-tion has been an average of only \$42 a month, which is less than the salary of the lamp tender, replaced by the electric switch light. The entire plant was installed complete by the

Arthur Frantzen Company, electrical contractors, 225 Dearborn Street, Chicago, Ill.

Railroad Legislation in Iowa.

The recent session of the Iowa Legislature passed The recent session of the lowa begister pre-three acts affecting railroads. The first one regu-lates the assessment of sleeping and dining cars. The annual statements of the railroads must "show the annual statements of the railroads must "show the average daily sleeping car and dining car service operated on each division." The second enlarges the power to condemn. Section 1998 of the code of Iowa is amended so that any company operating a com-pleted railroad shall have power to condemn lands for necessary additional depot grounds "or yards, for additional or new right of way for constantiations." additional or new right of way for constructing double track, reducing or straightening curves, changing grades, shortening or re-locating portions of the line, for excavations, embankments, or places for depositing waste earth."

The third act regulates the sale and redemption of tickets. Every railroad must provide for the re-demption at the place of purchase and at the general Passenger Agent's office of the whole or any in-tegral part of any unused passenger ticket that such carrier may have sold; and shall redeem the same at rate which shall equal the differnce between the price paid for the whole ticket and the cost of a ticket between the points for which said ticket has been actually used. No carrier shall limit the time in which redemption shall be made to less than ten days from date of sale at the place of purchase and six months from date of sale at the General Passen-ger Agent's office. Where the rate is regulated by statute tickets sold at the maximum legal rate must not bear any condition of limitation as to the time of use, or as to transferability, without first providing for the redemption of said ticket, as directed by the preceding section hereof, and also having notice of such provision and privilege of redemption conspicuously posted at each place where tickets are sold. To refuse or neglect to redeem a ticket within ten days is punishable by a fine of \$100. Nothing in this act is to prohibit the sale of mileage tickets bearing e conditions

All of these laws go into effect July 4, 1900.

The Cape Cod Canal.

The project of a waterway across the neck of Cape Cod has for several years been agitated in the Massa-chusetts Legislature. Several stock companies have been formed and dissolved in connection with the scheme, but it was not until January, 1899, during the last legislative session, that a charter was granted to the Boston, Cape Cod & New York Canal Company. Nothing has been done during the year beyond a preliminary survey and some plans for a

During the present session of the Legislature, the bill granting the charter was called up for amend-ment by general agreement. On Wednesday, April 18, the amended bill was passed for engrossing by the Senate. This action is claimed by the promoters of the enterprise to be tantamount to a final acceptance, as the House has already voted favorably on the main act. The bill will go before the latter body probably early in the week, and will then pass to the enactment reading.

Amendments introduced by Senators Post and Atwell on April 11, and incorporated in the charter, grant practically all that has been asked by the petitioners with regard to the issue of stock and bonds and provisions for the cancellation of indebt-edness. The maximum bond issue is fixed at \$12,-000,000, contingent upon the estimate of the Harbor and Land and Railroad Commissioners of the cost of construction. Stocks and bonds are to be under the control of the State Treasurer, who is to disburse only such sums as are directed by the dual Board, to the account of work actually done. Another amendment, probably introduced as a joke, provides that a deduction is to be made from the amount of the securities if any part of the cost of construction is paid by the United States Govern-

The President of the company is General Charles C. Dodge, of New York City. The promoters will give no other names, but it is stated that Mr. Rignal Woodward of Boston is interested. The company has opened offices in Boston, and shares them with the Cape Construction Company, of which Mr. Wood-ward is President, and which is eventually to build the canal.

The proposed route is across the narrowest part of the neck, from Barnstable Bay to Buzzard's Bay, the western part following the course of Monument River. The length from tidewater to tidewater is about eight miles, but the amount of dreiging neces-Google

sary to reach deep water on the Buzzard's Bay side will increase this to 13 miles. An immense break-water will have to be built off Barnstable, to shelter the entrance from the prevailing northeast storms in winter. The canal will cross the Old Colony Di-vision of the N. Y., N. H. & H. RR. at three points, and the bill granting the charter provides that the expense of providing and maintained analytications. expense of providing and maintaining drawbridges at these points shall be assessed upon the canal company by the dual Board.

depth at mean low water will be 30 ft., the width at the bottom 100 ft., and the width at the top 200 ft. The plans and surveys for the proposed route, bridges, breakwater, etc., have been made by Messrs. A. L. Rives and E. L. Cortheil, who are named as the company's engineers.

advocates of the bill claim that the canal will benefit Boston and New England generally, and they advance the following facts and arguments: That Cape Cod is one of the most dangerous coasts known; that 30,000 vessels, of which 6,000 are steam craft, are compelled to round the Cape each year; that freight Interests, especially those in perishable Southern fruits, will be greatly benefited by the estimated saving of one day's sailing time; that shipping rates on coal will be lessened, cheapening it over the whole of Eastern New England, and that a night trip from Boston to New York, without change, will be a great attraction in connection with passenger boats.

Boston, April 24.

The Erwin Steam Ram.

The Penberthy Injector Company of Detroit is putting on the market the Erwin steam ram for raising water to heights as great as 60 ft., the capacities varying from 4,000 to 8,000 gallons an hour, depending on the size of the ram and the lift; the steam pres-sure used is about 75 lbs.

These are especially intended for use at locomo tive water stations and where so used the numping plant consists of the ram, which is placed beneath the surface of the water, and the boiler.

The construction of this ram will be seen from the accompanying engraving showing a sectional view. At the time of starting, the ram is filled with water which has flowed in by gravity. When steam is turned on it passes through the steam pipe A, nipple C. conical screen D, the main steam port E and radial steam ports F, into the cylinder G. The water is then forced downward through the openings H into the surrounding discharge chamber I, where it passes through the annular check valve J and out of the discharge pipe L. When the steam reaches the lower end of the cylinder G, it is exhausted through the large openings H faster than it is admitted through the steam ports F, is condensed in the surrounding discharge chamber I, and the par-

tial vacuum is made more complete by a spray of water which enters from the discharge chamber I through the small opening K. When a partial vacu-um is formed, the pressure of the atmosphere on the water outside of the ram forces water upward through the bottom strainer M. The main check valve N is then raised and the valve rod O, which is rigidly attached to it, shuts off the steam at the upper end of the cylinder. A volume of water under atmospheric pressure is at the same time forced upward through the discharge chamber and out into the discharge pipe. A portion of this water, however, passes through the openings P. forces up the float R. which moves freely on the valve rod O, and refills the chamber. The water under atmospheric pressure having then lost in momentum, the steam acting down-ward on the valve rod, closes the main check valve, and through pressure exerted on the float, again forces water out of the cylinder and through the discharge chambers and discharge pipe. A covering pipe B surrounds the steam pipe for the distance it is

submerged beneath water, to prevent condensation. The chief advantages claimed for this method of raising water are that no oil or packing is required, the ram needs little attention, the friction losses are small and steam is used economically. Two sizes are made, the "Standard" being adapted for working

against a 60-ft. head, and the "Low Lift" rams against a bolt head, and the tail fails against heads of 40 ft., in which case larger quantities of water are handled. The rams are brass and the strainers are malleable iron with brass screens.

Signaling As It Is and As It Might Be.

AN IDEAL ORGANIZATION.

BY A. H. RUDD. (Concluded from page 241.)

Now as to maintenance. It does not pay to install work and then let it deteriorate. It should be always kept up to its initial efficiency. This can be done only by constant watchfulness, and sufficient force should be allowed, particularly with automatic signals, so that inspection can be made daily. The saving in delays to trains will pay for this additional care.

At large terminal stations this fact is fully recognized and proper maintenance given, especially where electro-pneumatic machines are employed. Observe electro-pneumatic machines are employed. Observe the constant inspection at points such as the Pitts-burgh, Philadelphia and Jersey City stations of the Pennsylvania, the Philadelphia terminal of the Reading, the Boston terminal of the Boston & Maine, and at the last and greatest of all, the South Station and at the last and greatest of all, the south Station of the Boston & Albany and New York, New Haven & Hartford in the latter city. At this magnificent station all departments worked together so har-moniously during installation that the best results were attained, and the liberal policy of the Terminal authorities in dealing with the contractors has made possible the highest development of the work.

The same policy should prevail at outlying points, delays, though not so annoying, still disarrange the service.

Signals are not infallible, and the possibility of one showing clear when it should indicate danger must be guarded against by every possible means. Weekly inspections, a common practice to-day, are not a sufficient safeguard, particularly for automatic signais at outlying points. A good deal may happen to them in a week. Tracks, engines and cars are in-spected daily, and oftener, and air brakes whenever the composition of a train is changed in any way. The mechanism which gives notice that their application is required should be equally well maintained.

On long stretches of track in outlying districts, velocipedes or track bicycles will pay for themselves in six months, keeping expenses down and at the same time making this necessary inspection practicable

Maintenance men should never be called on for construction work, but should be assigned a full daily task and be held to it constantly. With this end in view the following plan is recommended. As noted above, the Signal Engineer should have on his staff an electrician, a supervisor of interlocking and a foreman of construction.

Under the jurisdiction of the Electrician would come all electrical apparatus connected with automatic and "tower" systems, also crossing bells, telephones (where a separate department does not exist), annunciators, call bells, electric clocks, fire alarms, etc. Under the Supervisor of Interlocking, all mechanical work per-taining to the maintenance of fixed signals, and under the Foreman of Construction all new construction work. Such assistants can be readily found, as numbers of men are competent in each of the branches, although be paid enough to command the best talent. All Division Signal Inspectors, Repairmen, Battery-men and helpers will be appointed by and report to the Signal Engineer. No new work or extensive al-teration is to be started without an order to the Signal Engineer from his superior. The Signal Engineer will then give the necessary instructions, and notify the Superintendent of the division in which the work is to be done. Under the jurisdiction of the Electrician would come

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Signal Engineer or from the Supervisor of Interlock-

Signal Engineer or from the Supervisor of Interlock-ing. There will be one Signal Inspector of Automatic Sig-nals are installed to an extent requiring such Special Inspector. The Signal Inspectors of Automatic Signals will be assisted on each division by Signal Repair-men of Automatic Signals, Batterymen and helpers, as may be determined by the Signal Engineer. The Signal Inspector of Automatic Signals will have charge of the Signal Repairmen of Automatic Signals, Batterymen and helpers on his division, and will be responsible for the proper maintenance and working of all automatic Signals and any other signal apparatus placed in his charge. He must make constant ex-aminations and see that all imparatus is properly main-tained and operated, that all imps and fixtures are kept in good condition, that the electrical bonding is what all minor repairs without calling on the Signal Repairmen. He will make daily corts to the Division Superintendent and to the Signal Engineer. He will observe all instructions he may receive from the Signal Engineer or from the Signal Engineer. The Signal Engineer or from the Signal Instructions of the Signal Engineer or from the Signal Instructions of the Signal Engineer or from the Signal Instructions of the Signal Engineer or from the all instructions of the Signal Inspector, and make all instructions of the Signal Inspector, and make all instructions of the Signal Inspector, and make all instructs to the Signal Inspector, and keeping him at all times advised of their whereabouts.

With an organization as here sketched, with suffi-cient funds allowed for enough skilled labor at good wages to make daily inspections, delays to trains would be vary rare, breakdowns being anticipated and repairs made before failures occurred. And it is far cheaper to employ a few good men than a num-ber of poor ones. This is especially true in construc-tion work, where it would be considered a proof of imbecility to pay filters \$2.50 or \$2.75 a day for dig-ging foundation holes when sufficient talent could be obtained at \$1.35 to \$1.50 and the work better done. It is scarcely less idiotic to attempt to use laborers as fitters and have them spoil as much material as they use, making it necessary to do work once and sometimes twice over and then having it not quite right, and taking a foreman's time when he might be better employed. With an organization as here sketched, with suffibetter employed.

be better employed. Such a course, however, is often pursued by Signal Engineers to-day from sheer force of necessity, through inability to secure the necessary appropria-tion for a better class of men. They all know its wastefulness, but they are helpless. This method would not be dreamed of in the shops, or in any of the other well organized departments, and it is to be hoped that the day has dawned when it may be abolished in the Signal Department also.

CONCLUSIONS.

Signaling has passed out of the experimental stage. Appreciation of its value, and knowledge of its details and theory of practice, on the part of mandetails and theory of practice, on the part of man-aging officials as a rule has not developed as rapidly as the science itself. Consequently the work has not reached its perfect development en many roads through inability of the Signal Engineers to over-come preconceived ideas and prejudices and to ob-tain processing comparations.

Take perconceive intension and prejudices and to ob-tain necessary appropriations. It should be generally realized that proper signal-ing prevents accidents as well as aids in the hand-ling of trains, and that incomplete or bad work in-creases the action of the state of the creases the dangers.

creases the dangers. Complete installations should therefore be the rule, and they should be erected with a view to future re-quirements and having in contemplation a general scheme of full protection when the entire work is for the full protection when the entire work is finished.

Proper maintenance should be allowed for, includ-Proper maintenance should be allowed for, includ-ing daily inspections of automatic signals at least, as there is no economy in allowing expensive plants to deteriorate. To accomplish these objects the de-partments should be placed on a better footing, with a general complexitient of the fail work would be partments should be placed on a better footing, with a general organization so that all work would be maintained by Signaimen, who should be paid suffi-cient wages to insure the best taient available. The saving in expenses should not be attained through low wages and cheap materials or workmanship, but economies should be effected by parcia computer but economies should be effected by perfect organization, through keeping the size of forces and amount of stock on hand at the lowest possible limit, and all men constantly employed.

Signal Engineers should be given more responsi-bility and authority, with complete charge of their departments and all branches of the work, and al-Repartments and all branches of the work, and al-dowed leisure time enough to keep themselves posted on all new methods and advances in designs, and not one all new methods and advances in designs, and not order to induce the best men to continue in the work and to make it an object for younger men to fit themselves in technical schools and by practical training for work of this character. It is hoped that these suggestions will bring forth discussion from Signal Engineers, and that manag-ing officials also will find some points of interest. At all events the present conditions have been noted and the possible development of the Signal Depart-ment outlined, as the matter appears to some, at least, of the Signal Engineers of American railroads.

Preposed Railroads in Asia Minor

Preposed Railroads in Asia Minor. From apparently authentic reports it appears that the concession for the new railroad through Asia Minor to the Persian Guif has been granted to the Anatolia Railroad, a German company which now operates a line from Constantinople southeastwardly to Konleh, about 300 miles. The extension is to run from the latter place southeastwardly through Ma-rash and Bagdad to Bassorah. The line, as shown on the accompanying sketch, lies through Alexpo. This information, as well as the map, we take from a report by Consul M. A. Jewett of Sivas, Turkey, published by the State Department in a recent issue of Consultar Reports (No. 665). It is said that the French company owning the sale authorized to take 40 per cent. of the stock in the new extension, this having been the price of he withdrawal of this company's opposition; and local objectors had to be contiliated by a clause in the concession giving its Turkisk Government the differential rates, to constantion favore commerce with Germany as against other countries; and ing preferential rates, to constantion favore forman as well as from Constantinople. Germans may as well as from Constantinople. Germans may may as a strain the result favor commerce ing preferential rates, the constantion of the from Smyrna as well as from Constantinople. Germans are essid to constrol railroad traffic from Smyrna as well as from Constantinople. German interests they should secure a concession for a line from Samson to Bagdad. This line would one up a country which would furnish a much





* New cars purchased out of sinking fund. The size of the sinking fund in a specific case would depend upon the kind of cars, the work for which they were intended, etc.

were intended, etc. Six ordinary car trusts of ten years each would be required to accomplish results which could be obtained by the use of one thirty-year car trust. If our certifi-cates drew four per cent, interest as compared with five per cent, for the ten-year car trust certificates, we would effect a saving of about \$1,500 per year in inter-est. The time and expenses required in creating five ten-year car trusts would be avoided.



larger agricultural traffic than can be had on the line through Marash, as the latter traverses a barren and sparsely inhabited territory.

A New Form of Car Trust.

Mr. Edward S. Avery of $\overline{\sigma}$ Wall Street has devised a form of car trust which he thinks possesses advan-tages over the ordinary form of such trusts. The fol-lowing is an extract from a letter in which the plan is outlined at length:

Rest were the ordinary form of such trusts. The fol-lowing is extract. from a letter in which the plan is cullined at length: The second second second second second second second prefer to consensus of the unpaid cost of the cars an-ing the second second second second second second second prefer to obtain the capital for equipment by signing factor of the principal and drawing low interest. Re-print of the principal and drawing low interest is security, running for twenty or thirty years, requir-ing no annual payment on account of the principal and the anterest at the same rate as is obtainable on the anter of such security for a loan of thirty years? The integrity of such security could be maintained by minch would be expleted at theed of say every third year in the purchase of new cars. This simply provides specifically for maintaining the equipment. A covenant of the security be maintained the top which would be explored for the security at the end of every ther year out of the sinking fund. The following stape is the rate of 10 per cent. of the cost of the original cars each gate during the first three years and 18% per cent, per annum during the next three years and 18% per cent, per annum during the next three years and 18% per cent, per annum during the next three years and 18% per cent, per annum thereafter. The subage or stars you of the original cars (20 per cent. of \$100,000, or \$30,-\$000 could be applied in the tweilth yea

If steel cars, having a life of 20 years, were used, the annual payment into the sinking fund would be about one-half that shown in the table. annual paym

Eight-Coupled Tank Locomotive for Wales.

The Cooke Locomotive & Machine Company has recently completed two eight-coupled tank locomo-tives for the Port Talbot Railway of Wales; a road worked in connection with the docks at Port Talbot. The principal dimensions are as follows:



According to a Belgian newspaper, if the Belgian According to a Beigian newspaper, if the Beigian State railroads accept a proposition made by the French Northern Railroad, a train will be put on between Paris and Brussels which will run through without stopping, except at the border, a distance of 192 miles, in less than three hours. At present the quickest time between the two cities is 4% hours.