a 30-h.p., 20-k.w. set installed on one of the "Pennsylvania Limited" trains. The pamphlet announces also a new electric headlight.

The Hazard Mfg. Co., 50 Dey street, New York City, maker of wire rope, telegraph wire, insulated wire and cables, has issued a convenient pocket book designed to serve the double purpose of a memorandum (it contains 40 or 50 blank pages) and a reference book of convenient facts for telegraph and signal inspectors and repair men. A large part of the printed matter is devoted to a detailed catalogue of goods made by the company; but it also contains useful tables of weights and gages of wire, electrical resistances, measures of work, measures of weight and of pressure; and convenient mathematical tables.

The St. Louis Expanded Metal Fireproofing Co. has just issued a new catalogue on Steel-Concrete Construction Using Corrugated Bars and Expanded Metal which is much more comprehensive in its scope than the little pamphlet issued last fall on the "Uses of Expanded Metal." Five different systems of construction are described and illustrated, and their application to almost every form of structure is shown. These include pitch roofs, roundhouse roofs, wharves and docks, sidewalks, reservoirs, sewers, dwelling houses, dams, sea walls, oil tanks, elevated railroad structures, etc. There is a theoretical discussion giving the derivation of formulæ for the designing of steel-concrete beams of either rectangular or T section. Simplicity was aimed at to enable their ready application. The address of the St. Louis Expanded Metal Fireproofing Co. is 606 Century Bldg., St. Louis, Mo.

The Coughlin-Sanford Switch Co., Broad Exchange Building, New York City, has just issued a 32-page catalogue. It measures 6 in. by 9 in. and contains full description and illustrations of the Coughlin swing rail frog (which gives a continuous main line), and of a new interlocking system for protecting facing switches at outstanding points on main line.

The Railway Signaling Club.

The regular March meeting of this club was held in New York City on Tuesday last. President H. C. Hope was in the chair and there was an attendance of about 50. Seventy-two new members were elected.

The questions concerning adequate block signaling for fast trains, as outlined by Mr. H. M. Sperry and published in the *Railroad Gazette* of Feb. 27, were taken up seriatim and discussed informally. On the first point, the question of using an overlap where a distant signal is employed, Mr. W. H. Elliott, who was not present, sent a letter, stating that on the Chicago, Milwaukee & St. Paul the overlap has been used ever since the company first installed automatic signals. On the same principle that a space is always provided between a home signal and a derail, a space is needed between an automatic home signal and the potential fouling point ahead, which is the rear car of the supposed standing train. At the St. Louis meeting, two years ago, said Mr. Elliott, the weight of opinion was against the use of the overlap; but the C., M. & St. P. is satisfied that it should be used and that it is worth the additional cost. Near a large terminal, where no distant signals are provided, the overlap is made 1,500 ft.; with automatic block sections two miles or three miles long, and provided with distant signals, the overlap is made 1,000 ft. With block sections of less than 1.5 miles the overlap is made 600 ft. long. The Milwaukee road now has distant signals at one place 3,000 ft. back from the home signal and another is soon to be put in which will be 4,000 ft. distant; a separate post is used, if necessary.

The discussion was participated in by Messrs. Lane, Ten Eyck, Rosenberg and others. Mr. Sperry's main argument was that as discipline cannot be made absolutely perfect the safety of the passengers in the rear car of a train demands that there be some distance through which a train may run after it passes a stop signal. Mr. Sperry did not specify any length of overlap, but seemed to regard 800 ft. as the minimum length desirable. The arguments against the overlap centered in the statement that, as it practically leaves the engineman with a variable distance in which to stop, it introduces an uncertainty; and an uncertainty is a danger. The advocates of the overlap said that the engineman should still be required to stop *at* the signal, to which it was replied that you could not conceal from the runners the existence of the overlap. They would know that it was there, and would look upon it as a protection to them, permitting them to run past the signal. Mr. Sperry replied to this that the perfect discipline which is necessary without the overlap, and which his opponents said was practicable, could, with equal reasonableness, be said to be available to compel enginemen to obey stop signals, notwithstanding the existence of an overlap. Then the overlap would fulfil its most important function, of providing against those rare cases where signals are overrun, notwithstanding the employment of competent and trustworthy enginemen and the enforcement of the best discipline.

Mr. Ten Eyck brought out the point that with a block section, say, three miles long, and with a distant signal 2,000 or 3,000 ft. back of that, and, thirdly, an overlap of, say, 1,000 ft. beyond (ahead) of the block section, trains would be kept a long distance apart. This phase of the subject was not much discussed.

The question of what the length of the overlap should be was also passed over with but little consideration, though the trend of the discussion was that where speeds are ordinarily high it should be longer than at places; like the approach to terminal stations, where they are almost always moderate. Comparisons being made with English practice, it was pointed out that the requirement that a train must have passed both the home and starting signal at station B before the following train can leave station A is a significant recognition of the value of the principle of the overlap; and it was argued that this feature of English practice should be taken as a powerful argument in favor of the overlap.

Mr. Sperry, in concluding the discussion, summed up by saying that if we can stop our trains, where we wish to, by the simple force of discipline, we do not need the overlap; if we cannot, we need some mechanical provision. It was then moved that it was the sense of the meeting that the overlap was not needed in American surface railroad practice; and this was carried by a vote of 22 to 6. One of the speakers thereupon observed that the majority members had shown by their votes a profound confidence in the efficiency of American railroad discipline.

On Mr. Sperry's second question, Whether or not automatic stops should be used, the discussion was quite brief, a member pointing out that if, as the meeting had just declared, the overlap was not necessary, the state of discipline must be so good that we ought to assume that the automatic stop is still more unnecessary. Mr. Kinsman, the maker of a well-known automatic stop, was present and was allowed to briefly address the meeting in behalf of his device. He enlarged on the subject of human fallibility and the certainty that every man's brain now and then gets on a dead center. He said that he no longer advocated the use of an automatic device like his own without the use of a visual signal. He provides a registering device with his stop, so that it is possible at the end of each trip to show just what has been the situation at each signal passed by a locomotive. After further brief discussion a motion was made that the automatic stop, as thus far developed in this country, is not adapted to use on surface railroads. This was briefly discussed and the meeting finally voted that the President appoint a committee of five to investigate the subject of automatic stops, and with power to draw up specifications of what should be required in such a device; the committee to report at a future meeting. After this, a motion was carried that a committee of five be appointed to take up the question of discipline of enginemen; to investigate and report, and particularly to find out if inspectors of enginemen's conduct make formal written reports.

Audible signals were briefly discussed. It was stated that torpedoes, as now used in the Fourth avenue tunnel, New York City, give satisfactory results. Two torpedoes are used at each point, one on each of the two rails, in the tunnel a bell or gong is not satisfactory, although very large ones have been used. Mr. H. Raynar Wilson, of London, who was present, stated that Raven's locomotive-cab fog-signal, consisting of a whistle, which is used on the North Eastern of England, had not yet had an opportunity to fully show its merits, because there had been so little fog during the past two or three years. All of the engines on an important division are equipped, but the safeguard of requiring men, with torpedoes, at all signals during fogs, has not been relaxed.

The fifth question, "Uniform Location of Signals," was discussed only briefly, but Mr. Ten Eyck explained the practice of the New York Central on its four-track lines, where the overhead bridges, spanning the four tracks, which were put up about 10 years ago, are being gradually abandoned and superseded by bracket posts. On this road the two outer tracks are used by eastbound trains and the two inner by westbound. With the bridge arrangement a westbound engineman at night finds two lights side by side, one of which governs his track. An objection to this arrangement is the danger of a mistake in case one of the lights is obscured; and it was partly to avoid this that signals were placed on posts outside of all the tracks; though the new arrangement is far from ideal, because, on one track in each direction, the enginemen find their signals on their left hand. Mr. Wilson explained the practice in England as to the use of signals on bracket posts. The use of brackets, in the way that they are used in this country, is not common in England, except where necessary to set a signal out from among trees or other objects which would obscure the view.

The fourth question, "Engine Cab Signals," was not discussed. On the subject of green for all-clear, the testimony was all one way, and indicated nothing new; that is to say, those who use green like it, and those who do not, say that they are preparing to use it. But the adoption of suitable blade grips is the only practical action that these people have taken in this direction. Mr. Wilson said that the use, in England, of the same night colors in distant signals as in home, although it has never been shown to be dangerous, does give the operating officers some concern, and a Clearing House Committee is considering the question of making a difference between the home and distant.

The practice of the Delaware, Lackawanna & Western, and other roads, in blinding the lights of semaphore arms which indicate for diverging routes, was briefly considered. Mr. Wilson said that the objection to multiplicity of red lights, spoken of by Americans, was also a live question with English railroad men, and he thought that the blinding of minor lights was a move in the right direction. Nevertheless, any two signals at the same point have a relation to each other and caution must be exercised in obscuring either or any one of the signals in such a group.

This was the only discussion on Mr. Sperry's seventh question; and the eighth question was not discussed at all. The meeting adjourned at 6 o'clock; but there was an informal session in the evening which was enjoyed by a large proportion of the members who were present in the afternoon.

British Railways as Business Enterprises.*

Whatever else the railroads of the United Kingdom may be—great engineering works, elaborate pieces of mechanism, potent economic forces, revolutionizers of social and business habits, great employers of labor, indispensable public servants—they are all these, but, first and foremost, they are commercial undertakings, business enterprises, established to earn dividends for those who have supplied the capital to create them.

This is the characteristic feature of the railroads of this country, the feature which differentiates them from the railroads of a great part of the rest of the world. On the continent of Europe, and in our own colonies, the railroads are, speaking generally, the property or the child of the State, and the earning of profit on the capital invested is consequently of less importance than the rendering of efficient public service, the fostering of native industries, or the protection of the country in time of war. Even in America, the only part of the world besides the United Kingdom which owes its railroad system to private enterprise, the earning of a dividend for shareholders is usually of secondary importance compared with other ends which those who control the policy of the lines have in view, such as the carrying out of great industrial schemes, in which cheap transportation is an essential factor, the opening up of undeveloped territories, or the aggrandizement of individuals. A great part of the capital invested in American railroads, too, has been raised not by shares but by bonds, and bondholders have no voting power.

In this country we have secured, under Parliamentary supervision, a commercial system of railroad transportation which, for an industrial community such as ours, has a big balance of advantage over a State-owned system, a State-guaranteed system, a millionaire-managed system, or any other system which exists or you can imagine. But if you are to retain this system you must treat it fairly. It is a hardy plant and can stand rough weather, but it cannot remain sterile. It must bear fruit or it will inevitably wither. Give the investor a fair dividend and he will go on finding the capital for new lines and improvements. But if by legislation or local persecution you render railroad shares no longer profitable, then the only alternative is a State system of railroads, which is alien to the genius of a highly organized commercial community such as ours.

The prime consideration with the shareholder is, as we have already remarked, his half-yearly dividend. He wants the highest return possible on his investment, and he does not want to wait for that return longer than can be helped. Hence, owing to the predominance of the shareholders' influence upon English railroad policy, it has always been the custom to divide the profits of each half-year or year "up to the hilt," subject only to a more or less liberal current expenditure for the maintenance of the property.

Now, opinions may and do differ as to whether "betterment" is a legitimate revenue charge, and as to where exactly the line between revenue and capital charges should be drawn; but, speaking broadly, the English railroad practice has always been to give the dividend "the benefit of the doubt," and it has now become pretty clear that under this system too high distributions have been made to the shareholders in the past, and that by the amounts so abstracted (plus compound interest thereon) the capital accounts have been unduly inflated. To a certain extent, no doubt, the present shareholders are paying for this by receiving lower rates of dividend than they would have had if their predecessors had not capitalized charges which they ought to have paid for outright; still, the traveling and trading public may fairly argue that they, too, are bearing a burden which ought never to have been put upon them; in other words, that the fares and rates charged to the public have to provide interest for a certain amount of capital which would never have come into existence if a sounder and more far-sighted financial policy had been pursued from the start.

The question is a difficult and complex one, and whilst convinced that the British practice has led to over-capitalization, I am not prepared to say that the practice lately introduced by certain American railroad administrations of having three accounts: "maintenance," "betterment," and "extension,"—the first two revenue accounts and the third a capital account—is a proper remedy for the evil. For this leaves the rate of dividend payable to the shareholders at the absolute discretion of the directors, who can enlarge or contract the betterment account exactly as they think fit, thus making the divi-

*Extract from the eighth of a series of "Lectures for Business Men," delivered in connection with the Faculty of Commerce of the University of Birmingham, by Charles H. Grinling.