Simple or compound (both)	Simple.	
Kind of fuel to be used (both)	Bituminous coal.	
Weight on drivers	96,000 lbs.	122,000 lbs.
" truck wheels	30,000 lbs.	.....
" trailer wheels	24,000 lbs.	.....
Weight, total	140,000 lbs.	122,000 lbs.
" tender loaded	96,000 lbs.	75,000 lbs.
Wheel base, total, of engine	26 ft. 3 in.	10 ft. 10 in.
" driving	11 ft. 4 in.	10 ft. 10 in.
" total (engine and tender)	51 ft. 4 in.	38 ft. 2¼ in.
Length over all, engine	37 ft. 11 in.	.....
" " total, engine and tender	60 ft. 6½ in.	.....
Height, center of boiler above rails	7 ft. 10 in.	7 ft. 10½ in.
" of stack above rails	15 ft.	14 ft. 6½ in.
Heating surface, firebox	139 sq. ft.	106 sq. ft.
" " tubes	1,937 sq. ft.	1,732 sq. ft.
" " total	2,076 sq. ft.	1,838 sq. ft.
Grate area	42 sq. ft.	27 sq. ft.
Drivers, diameter	64 in.	52 in.
" material of centers (both)	Cast iron.	
Truck and trailer wheels, diameter	37 in.	.....
Journals, driving axle, size	8½x9½ in.	9x10½ in.
" truck " "	5½x9 in.	.....
Cylinders, diameter	19 in.	20 in.
Piston, stroke	24 in.	24 in.
" rod diameter (both)	3¼ in.	
Kind of piston rod packing (both)	Metallic.	
Main rod, length center to center	6 ft. 3¼ in.	6 ft. 1⅛ in.
Steam ports, area (both)	35 sq. in.	
" " width (both)	1½ in.	
Exhaust ports, area (both)	69.5 sq. in.	
" " width (both)	3 in.	
Bridge, width (both)	1¾ in.	
Valves, kind of (both)	10-in. piston.	
" greatest travel (both)	6 in.	
" outside lap	1 in.	¾ in.
" clearance	⅛ in.	0 in.
" lead in full gear	.....	.....
Boiler, type of	Belpaire.	Straight top. Radial stay.
" working steam pressure	190 lbs.	180 lbs.
" material in barrel (both)	Steel.	
" thickness of material in barrel	⅝ in.	⅞ in.
Boiler, diameter of barrel	56 in.	60 in.
Seams, kind of horizontal (both)	Butt.	
" " circumferential (both)	Lap.	
Thickness of tube sheets (both)	½ in.	
" crown sheets (both)	⅝ in.	
Crown sheet stayed with (both)	Radial stay.	
Dome, diameter (both)	28¼ in.	
Firebox, length	7 ft.	6 ft. 0 in.
" width	6 ft.	4 ft. 6½ in.
" depth, front	62¼ in.	58½ in.
" " back	56 in.	58½ in.
" material (both)	Steel.	
" thickness of sheets (both)	⅜ in.	
" brick arch? (both)	Yes.	
" water space, width (both)	Front, 4½ in.; sides, 4½ in.; back, 4½ in.	
Grate, kind of (both)	Shaking and rocking.	
Tubes, number	194	204
" material (both)	Wrought iron.	
" outside diameter (both)	2¼ in.	
" length over sheets	16 ft. 1 in.	14 ft. 6 in.
Smokebox, diameter	57½ in.	61½ in.
" length (both)	65 in.	
Exhaust nozzle (both)	Single.	
" " "	Permanent.	
Netting (both)	Wire.	
" size of mesh (both)	2½x2½ in.	
Stack (both)	Taper.	
" least diameter (both)	14 in.	
" greatest diameter (both)	19½ in.	
" height above smokebox	.....	4 ft. 2 in.
Tender.		
Type (both)	Swivel truck.	
Tank capacity for water	5,000 gals.	3,900 gals.
Coal capacity	8 tons.	6 tons.
Kind of material in tank (both)	Steel.	
Thickness of tank sheets (both)	⅜ and ¼ in.	
Type of under-frame	Wood with steel center sills.	Composite.
Type of truck (both)	Diamond frame.	
Truck with swinging motion or rigid bolster (both)	Rigid.	
Type of truck spring (both)	Elliptic.	
Diameter of truck wheels	36 in.	33 in.
Diam. and length of axle journals	5x9 in.	4¼x8 in.
Distance between centers of "	5 ft. 6 in.	6 ft. 3 in.
Type of truck bolster	.....	Steel.
Type of truck transom	.....	Channel.
Length of tank	19 ft.	.....
Width of tank	9 ft. 6 in.	.....
Height of tank, not including collar	4 ft. 10½ in.	.....
Type of back drawhead (both)	M. C. B. coupler.	
With or without water scoop (both)	Without.	
Special Equipment.		
Sight-feed lubricators (both)	Michigan.	
Bell ringer	Plattsmouth.	Crandall.
Couplers	Leeds pilot at front.	Chicago.
Muffler	.....	Consolidated S. V. Co.
Sanding devices	"She."	Leach.
Driver brake equipment (both)	Westinghouse.	
Tender " " "	Westinghouse.	
" " beam (both)	Monarch.	
Driver " shoe "	Ross-Mehan.	
Piston rod packings (both)	C. C. Jerome.	
Valve "	Dunbar.	C. C. Jerome.

Signaling As It Is and As It Might Be.

THE SIGNAL ENGINEER AND HIS FORCES TO-DAY.

BY A. H. RUDD.

(*Continued from page 148.*)

To the uninitiated the position of this man is a "snap." Usually he does not have to work with his hands; he sits in the office, writes a few letters, and frequently makes pictures, which do not take much time, and which almost anyone could do; sometimes he even has a draughtsman to help him, and possibly a clerk. He rides over the road, and occasionally may be seen examining the different plants, and somehow he manages to keep busy. How easily he earns his salary! This varies from $1,000 to $2,000 a year. Perhaps the usual rate for such services is in the neighborhood of $1,800. At the lowest rate he receives nearly as much as a first-class locomotive engineer, and even more than many conductors. His maximum rate, however, is less than that of the two men combined, who are responsible for the safety of any single train or engine running over the road. But by his carelessness in installation or maintenance, by lax methods of conducting his department, in choosing his assistants, or in keeping them up to their work, he has every such train at his mercy; and its crew, depending entirely on signals, as they frequently now do, may be led into death traps through his instrumentality, no matter how careful they may be.

The locomotive runner has great responsibility for a limited time each day, but the strain is then relieved for a longer period; the Signal Engineer's work is never done. The strain is constant, and being subject to call at all hours, his time is rarely his own. This is particularly true under the division arrangement. Is this fact recognized by his superior officers? The men who have these departments in charge to-day are for the most part young, signaling being a comparatively new branch of railroading. They are intelligent and active, and as a class are enthusiastic; and most of them are ambitious.

The writer knows of such a one, who remodelled a system under his charge, effecting a yearly saving in battery maintenance alone of more than his salary, who each year reduced the cost of maintenance of his signals, while at the same time the percentage of failures was also lessened, this covering a period of over four years. At last he was compelled to use his maintenance forces so much for construction work that the failures increased appreciably, and surprise was expressed at the poor showing. He was naturally pleased at the appreciation of his efforts.

Signal engineers may be divided into two classes: Specialists, and all-round railroad men. What are the chances of advancement for such men? According to the present outlook there is little ahead. This is an age of specialists, and if a man desires to reach the head of his profession, even in signaling, he must practically give his life to it. The problems are innumerable. New conditions are constantly developing. Every energetic man is working to better the service, and any new idea of one is usually given to all, through the instrumentality of the growing Signaling Club, and if a new idea is good it is put into use all over the country. It is a constant study to keep abreast of the times. Many signal engineers have not time at their disposal to devote to such development, though all can see that this advancement ought to be recognized as a part of a signal engineer's duties.

There are three courses open to these men. The signal companies pay far better salaries than the railroads, and there is room for a limited number of the best in their employ. Others may become heads of new departments on other roads, and if very fortunate, attain the heights, and get $2,000 a year. Is this worth the while of a brainy, active man, when the possibilities in other fields are considered? Lastly, if they do not like their treatment or their prospects, they are at perfect liberty at any time to quit the business (and large numbers of them have done so). The first opportunity noted is of necessity very limited; the second is within reach of the majority. But not one signal engineer in ten would continue in the work if he had not a faint and lingering hope of something better than this eventually. Most of them are living in hope, and "hope deferred maketh the heart sick."

In the engineering department there always looms up the possibility of becoming chief; in the motive power, the Superintendent's office may some day be attained; and the same is true of most other branches. Any of these positions are worth years of work to obtain, but the summit of the signal department grade is in a valley compared with these altitudes. There is room at the top, but that top is pretty near the bottom of other departments.

There are signal engineers who fit their places well, and are contented to go on with no hope of advancement, for they fear added responsibility; but they are not the men that progressive managements are looking for. Suppose, on the other hand, a man can find time from his routine work to study transportation problems (and many come before him, in a limited way, in the handling of trains at junctions, terminals, etc., where if his eyes are open he can learn much); to examine roadway methods and work where his opportunities (at interlockings) are also first-class; and look into motive power practice until he knows as much about it as the average division superintendent. Are opportunities afforded him at present for any advancement on these lines? There have been one or two cases of such promotion, but as a general rule, when an assistant or division superintendent is required, do the officers ever think of turning to the signal department? Civil engineers, roadmasters, despatchers, conductors, or freight agents are usually chosen, and yet there is very good material in our department on several roads; men who can and do handle their own forces successfully (and competent signal workmen in good times are a pretty independent lot), men who appreciate the need of good track and ample protection, and know how to give it; men whose study has fitted them to meet successfully any conditions that may arise, and of sufficiently good address to make a favorable impression upon their patrons and the general public; men with broad views and a good education. Should they not be considered when higher positions are vacant?

If the science of signaling is to be advanced in the future, as it has been in the past, and in order also that protection may be of the best, and absolutely sure, it must be remembered that the experimental stage is in a large measure finished, and that absolute knowledge of past failures must be possessed by those in authority. Consequently some inducement ought to be offered to keep there those now in the service, who have experience, and to induce the coming generation to take up the study.

This can be done in two ways: either by giving the signal department the importance it deserves, making its head a well paid official, placed more nearly on an equality with the men he consults with, and then employing only the best men, who have proved by past record their thorough competency; with young men of ability under them to be fitted for like positions; or by letting it be definitely understood that the highest position in it is the stepping stone to a better office in a wider field. By these methods an objective worth attaining will be created, and signal engineers will put forth efforts to achieve it and to prove ability to hold it.

If such a condition should be brought about (and some roads are apparently moving in this direction) we should soon see better work done in fitting men for this field. We have in our technical schools courses in mechanical, civil, and electrical engineering, and men graduated by them, after a few years (in the majority of cases) attain positions of importance, and many times of high salaries. Under the suggested conditions, signal engineering would also be recognized. Courses of study, and lectures with practical illustrations, would be instituted, and the technical training and theory thus obtained would, in connection with a few years' practical work, be of great value in developing a superior class of men.

All of us to-day are handicapped in a measure, as they would not be, in that we have had to take our theory in homeopathic doses, as we could absorb it in connection with our work. Many a weary hour has been spent in projected improvements and development, when a little theory of the right sort, used almost unconsciously, would have lightened the labor and saved time. Some have had the advantages of electrical training, some of mechanical, but very few of the combination of the two, which is necessary in the well rounded development required for successful work.

The Signal Force.

It will be noted from a preceding table that the rate of pay of these men is below the average for like kinds of work. A skilled interlocking repairman must have a thorough knowledge of all parts of the machine and connections in order to make repairs quickly and well. His is a position of considerable responsibility, as careless maintenance may easily mean loss of life, and he requires probably more intelligence than a shop mechanic who, as a rule, is confined to one or two machines or classes of work. Fitters must know considerable blacksmithing and carpenter work, beside having the general knowledge of a repairman; they should receive more pay than a carpenter. Foremen and supervisors should be paid proportionately. The positions should be classified so as to make a regular line of promotion, great care being taken in the selection of lampmen in the first place.

Every man employed should be capable of filling a higher position than the one he is chosen for. The wages of lampmen should be a little better than those of track laborers, and bright, active young men should be secured. There will be no difficulty in this if the applicants understand that they actually stand in line of promotion. This is the secret of success in many great departments which employ good men who accept smaller wages, perhaps, than the average but who are contented because they know there is something ahead. If, however, there is good ground for a feeling that higher positions will be filled by skilled men from other roads, work becomes mechanical, interest is lost, and the attempt is made to do as little as possible and keep the place. Until a good organization is built up with our own men, this condition is often unavoidable; but with due care such an organization can be established in a short time, and the good results will be surprising.

Green men can learn to properly care for lamps in a few hours. Almost any one can do the work. But the error should not be committed of employing on this basis. Let the lampman be chosen as indicated above, and instructed to assist the repairman, and he will soon acquire considerable knowledge of mechanical work. Then promote (not degrade) him to the position of helper in the construction gang. In two or three years he will become a good fitter, and soon a repairman, having had experience in all branches of maintenance and construction work. Such a workman knows that the positions of gang and division foreman and inspector are within his reach if he shows the requisite ability, and the results will be better than if higher wages were paid with no hope of future advancement.

In these different classes also the pay may be graded according to length of service and ability. For example, a lampmen may start at $1.50 a day and be increased to $1.60 after a certain time; as helper he would receive $1.75 to $2; as fitter, $2.25 up to $2.50; as repairman, $2.75 up to $3; all by small advances and by transfers to more complicated plants, as opportunities offer.

The wages, of course, vary in different localities, but a scale on the above general lines should be established and adhered to.

In the electrical branch, batterymen usually receive about $50 a month. With a line of promotion, $1.75 a day is a good starter, until they learn maintenance work by assisting the repairman; then promotion follows through the gang, to repairman, etc. We should neither make our departments training schools for the telegraph and telephone companies, nor depend on those companies to furnish us linemen; but should teach our men in the gang to climb and become fair linemen, and after they have mastered the fine points of maintenance, pay them a slight advance over the prevailing wages of "trouble hunters" in the aforesaid companies, as many men now leave us for such positions. Foremen and inspectors should receive enough more to establish a line of promotion.

With this plan conscientiously followed there will always be men ready at hand to fill any vacancies which may occur, except, perhaps, two or three at the very top, where technical education is required.

A course in a correspondence school, or, preferably, in some technical school, followed by a year or two in the interlocking gang, and a similar period with the electrical forces, will fit a man with a trained mind for intelligent work in the draughting room and office; and later for the position of assistant, and finally of signal engineer.

The object of the foregoing has not been to prove that everything is going wrong; for such is not the case. We are advancing, though slowly, and improving all the time. But I have aimed to demonstrate some of the weak points in present general practice, so that if the managements desire it, and will take the necessary steps, progress may be more rapid in the future, until perfect development is attained. With this end in view a few suggestions are offered regarding an ideal organization, which in the writer's opinion is closely approached on several roads; although the fact remains that the departments themselves are not yet placed in the important position which they should occupy; and the intelligence required to manage them is probably not proportionately appreciated and compensated.

But, after all, arguments and opinions do not always convince or carry weight; "the proof of the pudding is in the eating of it," and a statement, if it could be obtained, of the methods of installation, character of the work erected and maintained, reliability of the apparatus, and freedom from failures on such lines as the Lehigh Valley, Michigan Central, Illinois Central, Chicago & Northwestern and others where the signal engineers are in full, unhampered charge, compared with a like statement from some of the lines with equally good forces, where a different system prevails, would make very interesting reading and undoubtedly furnish facts enough to settle the organization question once and for all.

[TO BE CONTINUED.]

Distant Signal Wires Enclosed in Pipes.

As recently noted in the Railroad Gazette, there are a number of distant signals on the Lake Shore & Michigan Southern which are connected to the cabin by wires which are laid in iron pipes beneath the surface of the ground, the pipes, after the wire is inserted, being filled with oil. Mr. E. D. Wileman, Signal Engineer of the road, has given us an account of how these connections are put in, which in substance is as follows:

We have a dozen or more distant signals connected in this way. They are of various lengths, but only two or three have been in use any length of time. The one first put in is at Waterloo, Ind. The line runs through the station ground and through the valve well of a stand pipe. It has been in nearly two years and has given perfect satisfaction. It requires no adjustment except perhaps twice a year; and it works easier and better than any distant signal on the line not so connected.

We enter the pipe as soon as convenient after leaving the wire lock at the derail and continue the pipe as near the distant signal as practicable. The pipe is laid in a box of 1 in. boards, 6 in. wide. The box, without the top board, is laid in a shallow trench which is made as near as possible in a direct line to the signal. It is carried straight under crossovers or turnouts whenever necessary. If the general direction lies along a curved main line we follow that curve just a little farther out than the ends of the ties. The side strips of the box are put on so as to break joints with the bottom about 1 ft., and the top pieces are laid on so as to make a break with both the others of another foot.

The half-inch pipe is looked over and straightened, and a rod is run through to clean out ordinary dirt and roughness. The ends are reamed out and any sections with internal wrinkles or defects likely to injure the wire are culled out. Then this pipe is laid in the box. The wire, which is in one complete length, is kept drawn through each section as it is jointed up so that when the pipe is all in the box the wire is all in the pipe. Then the pipe is covered with hot roofing cement. Coal tar or pitch would be cheaper and probably equally good.

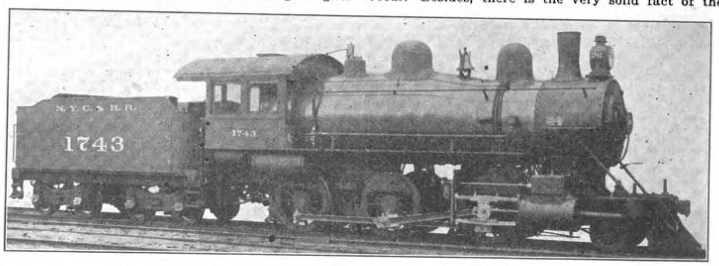
The cover is nailed on as soon as the roofing cement is on. In each line of pipe we insert near the middle a drip well made of a U-shaped 2 in. iron pipe which can be easily pumped empty. In some situations the boxing for the pipe is not absolutely necessary, but where there are cinders in the ground the pipe will soon be corroded if not protected.

A separate ½-in. pipe is used for each wire. At each end we first put on a washer of the right size and then screw a long cap over a packing of wicking and tallow to prevent waste of oil. This is especially necessary if the line is on such a grade that one end is much lower than the other. This packing does not need to be tight enough to interfere in the least with the free movement of the wire. Crude petroleum is used for filling, and the water needs to be pumped out of the well and oil filled in to the pipe about twice a year.

The cost of this arrangement is about $115 per thousand feet.

A Mogul Engine for the New York Central.

The engraving herewith, from a photograph, shows one of the new mogul freight engines building by the Schenectady Locomotive Works for the New York Central & Hudson River Railroad. The designs and specifications were furnished by the mechanical department of the New York Central and were worked out under the direct supervision of Mr. A. M. Waitt, Superintendent of Motive Power and Rolling Stock. A few of the leading weights and dimensions of this engine are compared in tabular form with weights and dimensions of the New York Central moguls described in our issues of June 30 and Sept. 29, 1899:



Mogul Freight Locomotive for the New York Central & Hudson River Railroad.

Mogul Freight Engines—N. Y. C. & H. R. RR.

	Class P, 1898.	Recent Mogul.
Weight in working order	152,000 lbs.	155,200 lbs.
" on drivers	131,600 lbs.	135,500 lbs.
Cylinder diameter and stroke	20 x 28 in.	20 x 28 in.
Diameter of driving wheels	57 in.	57 in.
Outside diam. of boiler (first ring)	67¼ in.	67⅞ in.
Working pressure per sq. in	180 lbs.	190 lbs.
Heating surface, tubes	2,372 sq. ft.	2,321.6 sq. ft.
" " firebox	211 sq. ft.	185.6 sq. ft.
" " total	2,583 sq. ft.	2,507.2 sq. ft.

Other particulars of these new engines follow:

Fuel	Bituminous coal
Wheel base, driving	15 ft. 2 in.
Horizontal thickness of piston	4½ x 5 in.
Diam. of piston rod	3⅜ in.
Size of steam ports	18 in. x 1⅛ in.
" " exhaust	18 in. x 2¾ in.
" " bridges	1⅛ in.
Valves	Richardson balanced
Greatest travel of slide valves	5½ in.
Outside lap " " "	⅞ in.
Inside " " " "	Clearance, 1/16 in.
Lead of valves in full gear	1/16 negative lead full gear forward; 3/16 negative lead full gear back
Material of driving wheel centers	Cast steel
Tire held by	Shrinkage
Driving box material	Gun metal
Diam. and length of driving journals	9 in. dia. x 12 in.
" " " " main crank pin journals	(Main side 6¾ x 5¼) 6 in. dia. x 6 in.
" " " side rod crank pin journals	Back, 5 x 3¾; front, 5 in. dia. x 3¾ in.
Engine truck	Swing bolster
" " journals	6¼ in. dia. x 10 in.
Diam of engine truck wheels	30 in.
Kind " " " "	N. Y. Car Wheel Works Plate
Boiler, style	Extended wagon top
Firebox, length	108⅛ in.
" width	40⅜ in.
" depth	F., 82 21/32 in.; B., 70 21/32 in.
" crown staying	Radial stays 1⅛ in. diam.
Tubes, number	366
" diam	2 in.
" length over tube sheets	12 ft. 2¼ in.
Fire brick, supported on	Studs
Grate surface	30.3 sq. ft.
Exhaust pipes	Single
" nozzles	5 in., 5¼ in. and 5½ in. diam.
Smoke stack, inside diam	16 in. at choke; 18½ in. at top
Tender, weight, empty	44,700 lbs.
Water capacity	5,000 U. S. gallons
Coal "	10 tons

The New Line to London.

By W. B. Paley.

The result of the first complete half year's working of London's newest railway, the Great Central, is very discouraging and there can be no doubt the company is in a position of some difficulty. Several unforeseen and unpreventable causes partly explain the misfortune, but the worst feature is that the London extension is not yet carrying anything like the traffic that was looked for. Of the total increased traffic receipts, compared with the last half of 1898, of £175,000, nothing whatever is left as increased profit to pay interest on the vast cost of the London line. On the contrary, working expenses are up by the heavy sum of £248,500, leaving the company actually more than £73,000 to the bad, after working, roughly, 100 miles of new line. This, however, by no means fills the cup of bitterness. So much as £50,600 has had to be provided out of revenue for interest upon what are called Lloyd's bonds, a security bearing 4 per cent. interest and issued instead of cash in payment for works and materials put into the line to London. The sum of £22,000 bearing 4¼ per cent. interest has been paid for hire of engines and rolling stock; about the most unsatisfactory form of expense a railway can have. These two securities, by law, take precedence over even the debenture stock and form, as it were, a first charge upon the undertaking. Nothing is added to the reserve fund, which had £7,000 credited to it a year ago; on the contrary £10,000 is now taken from reserve. With an increase of about £9,000 on certain joint line receipts, these extra charges added to the ordinary working expenses come to some £60,000 more, leaving the real deficiency of earnings, in round numbers, £133,000. Consequently, except 1 per cent. upon the 5 per cent. preference stock of 1879, no capital issued after that date receives a penny of interest.

But there are some hopeful features. Steamship receipts are nearly £11,000 greater, at a small increased cost; joint lines nearly as much, though two-thirds of it has gone in higher working cost; and a rise of about £10,000 in compensation for injuries is due to an accident which happened some time before the company went to London, and is not likely to recur. Besides, there is the very solid fact of the general traffic increase of £175,000, which is a great deal for a line of about 453 miles, although the company partly owns some 200 more and with certain running powers works its engines over 952½ miles of railway in all. About 66 miles of line are still under construction, representing a good deal of dormant capital, though part of it will not be wholly owned by the Great Central.

After all, it is too much to expect that the new line should pay its way from the first. Wonderful as is the volume of trade between London and the districts it serves, the facilities of the older lines for dealing with it are immense. The management is energetic. The Manchester service has been gradually quickened up as the banks get well consolidated, the fastest time now being 4 hours 35 minutes over the 206 miles, with three stops. After building no single-driver engines for many years, the Great Central is now turning out some at its Gorton Works, to run between Nottingham and London on the Manchester service. They are to have inside cylinders 19½ x 26, leading bogie, very large and high boilers, and 7 ft. 9 in. drivers. The longest and fastest run is now (February) London to Leicester, 103 miles, in exactly two hours.

The company's relations with the Metropolitan Railway, over whose line it runs for over 40 miles, seem to be a little better, and a good many trains now call at Harrow and Aylesbury, on that line, when required. The alliance with the Great Western, which will enable the Great Central to free itself of the unfriendly little line, is an accomplished fact. In addition, the Great Central have begun a line from Neasden, where their London engine sheds are, to Northolt, on the Acton & Wycombe section now constructing by the Great Western. This route will somewhat increase the distance from London to the large towns by the Great Central route, which is already longer than any of its competitors, but will give better gradients and a free hand in arranging the train services. A connection has also been made at Neasden which will be of great value for coal traffic. It was mainly for the sake of carrying their own coal traffic themselves that the Great Central came to town. Some very good positions for parcels and goods receiving houses have been secured in various parts of London, mostly as near as possible to those of the Great Northern.

The London establishment is now practically complete. The great hotel is in full work and doing well. The London coal yard is full of business, but the connection with the Regent's Canal seems to be doing little. Powers are sought to make several short branches to collieries, etc., and a link to shorten by