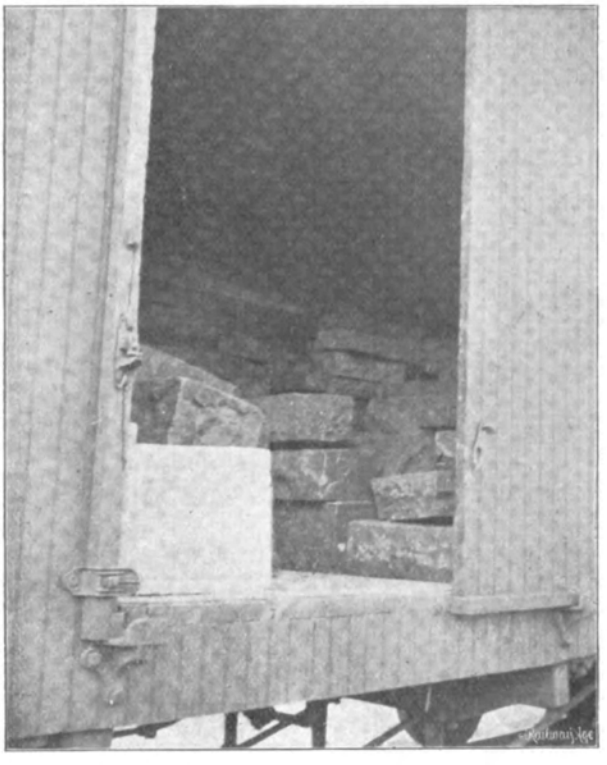
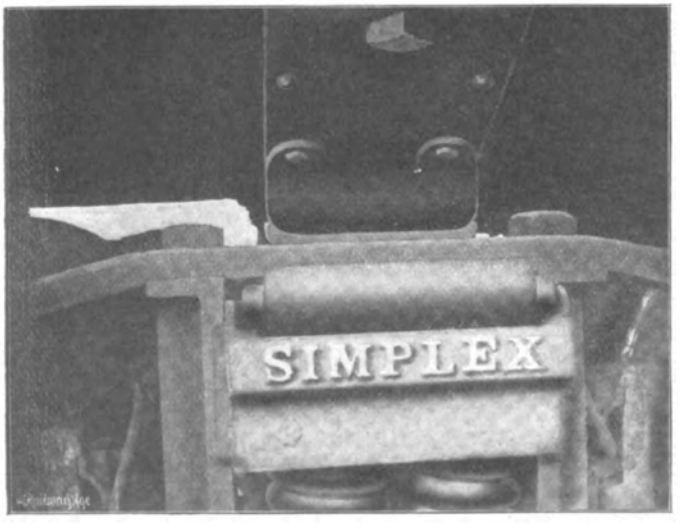
below the wooden bumper beam at the bottom and this beam is strengthened by a steel angle bolted to the outside.

The most interesting thing about this car is the stiffness, as demonstrated by service of its underframe and bolster construction. Designed for a capacity of 80,000 pounds, after continual service for two years it was



NEW YORK ONTARIO & WESTERN BOX CAR—TEST LOADING.

loaded with 126,800 pounds of stone. After running 68 miles over rough branch line track it was weighed and measurements taken at the side bearings, which still showed ⅜-inch clearance. Photographs taken before the car was



NEW YORK ONTARIO & WESTERN BOX CAR—BOLSTER CONSTRUCTION.

unloaded show the condition at the side bearings and also show that the car did not sag at the center.

This car was built by the South Baltimore Car Works and was equipped with the railroad company's standard arch-bar trucks, with Simplex body and truck bolsters. Other special equipment included Westinghouse brakes, Miner draft rigging, Gould couplers, Gould journal boxes, Brady journal bearings, Davis doors, Simplex brakebeams and Murphy roof

INDUSTRIAL DEPARTMENTS OF RAILWAYS.

The necessity confronting railways of providing for the future of their traffic—for its steady growth and for permanent accretions thereto—has brought to notice the expert commercial economist having charge of the industrial department of the road as agent or commissioner. Many of the large railroad systems in the United States, in providing for future business, have, within recent years, developed an activity through the medium of this official that is remarkable, both on account of the results obtained and the resourceful methods employed. The aim of the industrial official is wisely and systematically to encourage the creation of new, permanent, traffic producing centers along the system, to see that each new industry is placed in the best available environment for its growth and future prosperity, and, in general, to induce capital to contribute to as complete a development of the road's resources as practicable. This work is being accomplished in some instances with a noticeable degree of effectiveness.

The success of American industrial departments has been sufficiently marked to have attracted attention abroad. Officials of the Russian government made a thorough investigation of their methods and, in a sense, employed the advanced ideas that were discovered in the development of the crown forests of the empire. Prof. Dr. Walther Lotz of Munich, who made a similar investigation, said in an article that the traffic measures of modern management, comprehending the widest conceptions of commerce, are most potential factors in economics; and he intimated that the friends of modern development for eastern Germany could profitably study the industrial policy of American railway systems.

The indirect methods employed by the industrial department to assist in the increase of revenue, as compared with the more obvious work of the regular traffic department toward this end, placed it at the outset among the things that are experimental; and the impossibility of realizing very early results made the first departments pioneers by a considerable margin. The establishment of industries which will produce new traffic would seem naturally to belong to the duties of the traffic department, and the initiative in this direction to have originated with that department, but the demands of current business upon traffic officials precludes the possibility of their devotion to extended plans for the creation of future business which, if given thorough attention, must have systematic study, investigation and experimentation on an extensive scale. The traffic department could not and did not undertake the work in other than an incidental way. It encouraged the location of all industries whose promoters manifested a desire to locate on the line, and doubtless extended voluntary invitations where the opportunity to do so was obvious. But it was not until 1887, when Mr. Samuel Spencer became president of the Baltimore & Ohio, that the idea of taking this work out of the hands of the traffic officials was acted upon.

Mr. Spencer perceived that the resources of the Baltimore & Ohio would assist the fortunes of the property under his charge to the extent that they were systematically developed, and he concluded that if the territory of the road possessed a wealth of opportunity which, if improved would greatly augment its traffic, it was the proper function of the company to take the matters up with the investing public, rather than to leave them exclusively to the occasional or chance investigator. The work was intrusted to Mr. M. V. Richards, who was then in the employ of the land department of a western railway, engaged in the work of pushing the sales of the company's lands and attracting immigration, the only kind of work which at that time approximated in any degree that contemplated by Mr. Spencer. It happened, however, before the department was under way,

that Mr. Spencer severed his connection with the Baltimore & Ohio to take charge of important railroad interests associated with the banking house of J. P. Morgan & Co. and this prevented him from carrying to fruition the plans he had entertained for the development of the Baltimore & Ohio, although the department he established was successfully continued.

It should be noted that some difference of opinion exists as to the exact origin of the industrial department, arising out of a differentiation between the work of the independent industrial commissioner and that of the industrial agent who is also land, or immigration, agent, or both. The first industrial department organized without calling, even in an incidental way, upon the experience of the land departments, which have existed for 30 years or more, was organized in 1901 on the Chicago Milwaukee & St. Paul by Mr. Luis Jackson, now industrial commissioner of the Erie. Mr. Jackson organized his department as a highly specialized branch of traffic development. The methods which he employed, which differ from those of other industrial officials not based upon them, appear to have been evolved from some articles written by Mr. Jackson after investigation for Mr. P. S. Eustis of the Chicago Burlington & Quincy and distributed among eastern manufacturers by that official in 1890. These articles analyzed the western industrial and commercial situation in considerable detail, enforcing upon the attention of the eastern manufacturer the reasons why it paid to manufacture in the West. At this stage the idea was not so much to secure industries that had no existence before, as to induce manufacturers of the East to locate nearer the new sources of supply, assuring them that, from a sound economic standpoint, they would be no farther from the world's markets. The plans for the operation of the Saint Paul's industrial department were all formulated by Mr. Jackson, who suggested his own title, that of industrial commissioner.

Following the subject in historical sequence, it was in 1894, when the Richmond and West Point terminal associated properties were organized as the Southern Railway, that the resumption of Mr. Samuel Spencer's plan was made possible. When made president of the Southern, Mr. Spencer lost no time in putting into effect the same plan that he had contemplated for the Baltimore & Ohio, and Mr. Richards was invited to head the department, which embraced both land and industrial development. Mr. Richards' title was that of land and industrial agent.

The industrial departments organized by Mr. Richards and Mr. Jackson are doubtless among the foremost in effectiveness and therefore represent satisfactory examples for any desired comparison of the chief difference of organization and method discoverable between industrial departments of railways in the United States. Both are founded upon the maxim that the secret of success in industrial development is largely in the knack of associating the right kind of men with the right kind of opportunities. The manner in which this is brought about on the Southern, and necessarily so because of the great extent of the system and the varied nature of the localities served, is through district agents, each having charge of his own defined territory and reporting to the chief agent, who in turn reports to the president. The work of development on the Southern embraces in about equal measure the pioneer work of the land agent and the naturally subsequent duties of the agent who is interested in securing new kinds of industries in a region already giving evidence of industrial progress. The extension of switching and other facilities to new industies—apparently a very important matter—is taken up through the usual channels of authority. In carrying out the details of the work it is regarded as essential that the land and industrial department should work in very close touch and sympathy with other departments.

"The land and industrial agent, by reason of the very nature of his work," says Mr. Richards, "is something of an enthusiast, with the instinct of achievement strongly developed, with a multitude of projects "in the air" which he is anxious to materialize; and where concessions are required from his company as a prerequisite to the establishment of some important industry or some interest likely to lead to important developments, he is often found taking positions in his recommendations which involve quite decided departures from the traditional conservatism of the traffic department. The traffic man is essentially an opportunist. He bends his energies anew to make the revenue showing of his department or division a little better for the current week than for the corresponding week of last month; the business for the month better than the corresponding month of the previous year, for it is in such conclusive showings that the company's stockholders and the investing public are mainly interested. He is likely to look askance at any conditions involving expense on the part of the company in which the matter of immediate revenue does not bear a just correspondence to the outlay, while the industrial agent may be in favor of the concession as a means of initiating a whole line of promotion and development which might otherwise be deferred for years, or perhaps be diverted in another direction and irretrievably lost. In the settlement of such questions viewed from different standpoints, a differentiation is called for that did not exist in railroad administration prior to the appearance of the land and industrial department—a definition of the purely industrial question without complication with the purely traffic question, and due allowance of a fair measure of authority in the determination of questions that are 'industrial.' These are often based upon considerations which may be only casually and imperfectly understood by the operating and traffic departments. In applying a system of promotion to a large and comparatively undeveloped section in the way that a great railway system is able to do, recognition must be accorded that tendency of industries to centralize at particular points in class-related groups—as, for instance, cotton goods at Fall River, silk goods at Paterson, stoves at Detroit and Troy, gloves at Gloversville, shoes at Lynn, furniture at Grand Rapids, etc.—a tendency which does not necessarily imply favorable natural environment as much as other conditions artificially created. To direct this tendency along lines of natural adaptability is obviously the primary desideratum in promoting such a territory, and the great object held in view by Mr. Spencer in undertaking development in the South. The railroad operator and the shipper are influenced in their relations by divergent points of view. The shipper says: 'Give us better facilities, more cars, better dispatch and lower freight rates, and we will be able to give you more business in return.' The railroad rejoins: 'Give us more business and we will increase the facilities and cheapen transportation proportionately.' The land and industrial department of the modern railroad is the offering of a compromise between these divergent attitudes. While the railroad cannot always undertake to anticipate the creation of traffic with its facilities, as a means of encouragement to the shipper, it can, and does, through its land and industrial department, help the communities along its lines to justify the increase of traffic facilities, by helping them to increase their traffic production. This department of a great railroad, where it confines, as is the case of the Southern Railway, the land, industrial and immigration features of promotion and development—is one of endless ramifications and infinite complexity. It has been appropriately characterized as a catch all, to which are referred all matters demanding consideration or investigation, which do not come strictly within the purview of other departments."

The methods employed by Mr. Jackson first on the Chi-