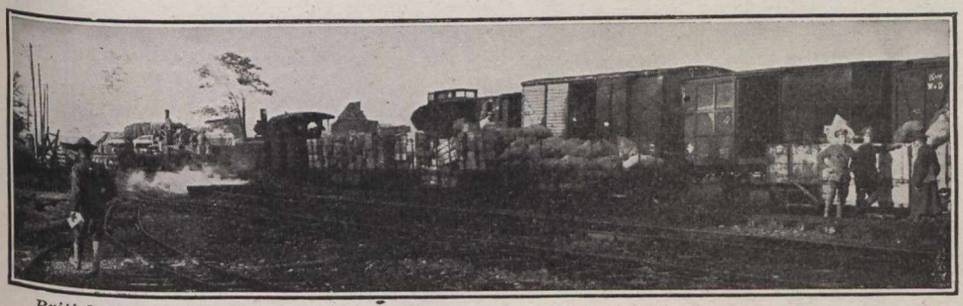
petrol tractor, 20 h.p., weighs somewhat less than 2 tons. There is, in addition, a tractor weighing about one ton, which consists of a small auto engine on a special truck; it is used for inspection trips or for hauling single carloads near the front. The table printed elsewhere in this article gives the load test on different grades for the several types of machine.

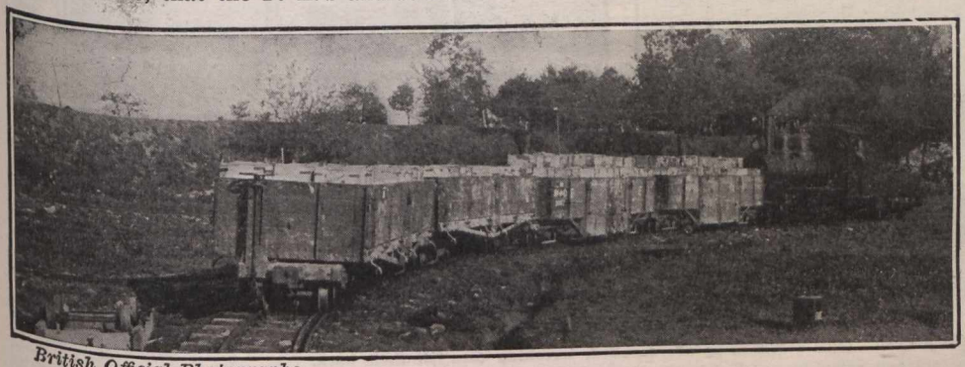
The steam locomotives, on account of their visibility, as before noted, and also



British Official Photographs
Fig. 2. Layout at standard gauge railhead providing for trans-shipment to light railway cars.

the desirability of running them on track which is fairly well aligned, are reserved principally for the rear area haulage, while the petrol-electrics, and particularly the lighter petrol tractors, are for use close to the front lines. The petrol-electrics are equipped with internal combustion engines and generators, the motors being mounted directly on the axles. As indicated in the table, they are for heavier work than the plain petrol machines.

I asked one locomotive man about the relative operating difficulties with the light and heavy rolling stock. He replied, in substance, that the P. E.'s and steam



British Official Photographs
Fig. 6. Gondola cars of the flat-bottom and well-bottom types are used in large numbers.

locomotives, if derailed, dug down into the roadbed, and, on account of their weight, came to a quick stop. The lighter machines, while easier to handle in case of accidents, generally ran farther off the rails.

On the petrol-tractor trains the crew consists of two men, driver and brakeman. With steam haulage, a third man, the fireman, is required. The maximum speed allowed is about 8 miles an hour, with a limit of 3 miles an hour at grade crossings.

A great many types of cars are used in light railway operation, depending on the kind of material to be hauled. The bulk of the freight handled comes under the following classifications: Ammunition, timber, coal and coke, rations, ballast, R. E. stores, salvage, stone for highway maintenance, with troops going to or returning from the front. In one army which I visited about a dozen different kinds of car were in service. The prevailing car (fig. 6) is a gondola about 20 ft. long and 5 ft. wide, made in both the flat and the well types. These cars can carry about 10 tons of ammunition, but with lighter and more bulky material, such as R. E. stores, the load per car may be only 5 or 6 tons. With troops the load per car will average about 3 tons. For perishable rations covered box cars are available. Then, too, there are small 4-wheeled wagons, 8 ft. long, for loads of 3½ tons each. For the hauling of heavy ordnance special trucks have been developed.

Hospital cars (fig. 7), fitted up with

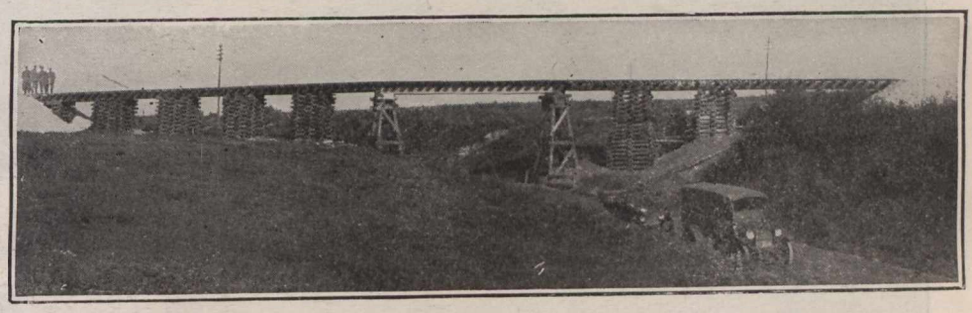


Fig 3. Trestle on a light railway. British official photograph.

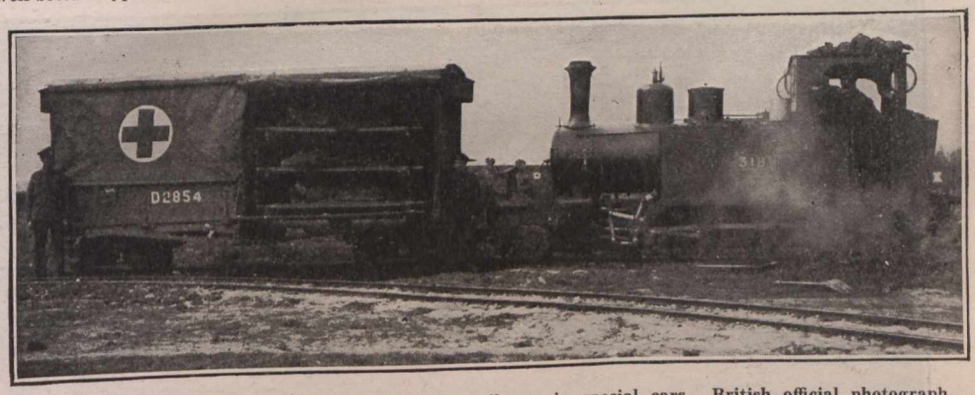


Fig. 7. The wounded are transported by light railways in special cars. British official photograph.

banks of berths for carrying the wounded, are included in the rolling stock. I was told by the Assistant Director of Light Railways in one army zone that under normal operating conditions he considered 75 tons a 10-ton car a week a fair working average.

In addition to the car types enumerated, there are wrecking cars and cranes (figs. 8 and 9), for lifting derailed locomotives and tractors, and special groups of four or more cars, each 20 ft. long and 5 ft. 4 in. wide, constituting machine shops on wheels (fig. 10). The equipment in the latter includes drills, grinders, hack-saws, lathes and planers. These tools are operated by power from one of the standard petrol-electric tractors, which, if the occasion should demand, can haul the machine shop forward or backward. The shop on wheels remains in one location, however, unless it is decided to change the light railway base. The sides of these machine shop cars are hinged at the bottom and open outward, forming a platform extension on each side. Where the repair work is too heavy or complicated to be handled readily in the field, the rolling stock is shipped to a large central repair plant, thoroughly equipped with machine tools, spare parts and appliances of every sort for rehabilitating engines or cars suffering from shell shock or other ailments incident to light railway operation. We had intended to make a detour in our route for a visit to this central plant, but our schedule was so full that time did not permit an inspection of this very important feature of light railway work.

The information concerning light railways which I had picked up in scraps of conversation here and there before my visit to the front had led me to believe that these systems were operated to some extent on the go-as-you-please plan. An inspection of the field control posts and central train despatching offices in every army on the British front quickly dispelled this impression. Traffic is closely regulated, and the system in force allows the A. D. L. R. or his assistants to know at every hour of the day where each locomotive, tractor or car is, whether it is loaded or empty, what kind of freight is being hauled, and scores of similar details. In fact, one of our U.S. railway operating detachments has gone to the length of preparing a timetable for its section. The operating scheme in all of its main features is standardized along the whole front. From the nature of