

THE BALTIMORE AND OHIO RAILROAD COMPANY  
Engineering DEPARTMENT

THE HOLLOW HEADED RAIL FOUND ON HARSHMAN SIDING

THREE MILES NORTHEAST OF DAYTON, O.

(From "The Miami Conservancy Bulletin"  
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## Old Hollow Headed Rail Found on Harshman Siding

Interesting Pear-Shaped Sections Rolled Before Steel Came Into Use.

An interesting circumstance in connection with the wrecking of the old Big Four R. R. line, following the relocation, was the discovery of two pieces of "prehistoric" rail in use in the Harshman Siding, three miles northeast of Dayton. This siding served an old mill, still standing, dating back into the fifties of the last century. Near the end of the siding a few short lengths of light rail were found with a pear-shaped head instead of the T head now in use. Inspection showed that in addition to its peculiar shape, one of these old rails had a hollow head, as shown in Fig. 282. This picture is taken from a "sulphur print," kindly furnished by the Hunt Inspection Bureau of Chicago, who were good enough to make an examination and analysis of a section of the old rail sent them. The end of the rail was polished. A piece of photographic paper was then dipped in a dilute solution of sulphuric acid and laid on the polished face of the rail for a short time (the period being usually about one minute). The parts of the steel higher in sulphur left a darker impression on the photographic paper than those parts lower in sulphur. Thus the "sulphur print" shows in a rough way the distribution of sulphur in the specimen, this element being one of the most deleterious impurities. This action shows plainly in Fig. 282, the base and web of the rail appearing much darker than the head, indicating that the latter, which in service took the wear, was of much purer matter. Besides furnishing the sulphur print, the rail was analyzed chemically.

The etching and analysis both show that the pear-headed rail is of iron and dates back to the old days before steel had taken the place of the earlier used material. The transition began about 1865 and was due to the better wearing qualities of steel under the increasing severity of the hammering and mashing action of car wheels on the rail head; this being due in turn to the steadily increasing weight of locomotives and cars.

Thus the chemical analysis carries the date of the rail back to 1865 or earlier. The shape carries it still further back, to 1859 or 1860. This is shown by records of the Cambria Iron Company, at Johnstown, Pa., given in the upper part of Fig. 283. This series shows the shapes of the successive grooves of the rolls through which the redhot iron "bloom" or billet was passed in the mill to bring it to the final rail shape. These successive grooves are numbered "1, 2, 3, 4, 5," the last showing the identical pear-shaped hollow head found in the Harshman Siding. The date of the record is 1859.

This information was furnished by Mr. G. B. Waterhouse, Metallurgical and Inspecting Engineer for the Lackawanna Steel Company of Buffalo, N. Y., to whom also sections both of the solid and hollow-headed rail were sent.

The lower set of shapes in Fig. 283, also kindly furnished by Mr. Waterhouse, show the successive rail shapes used on American railways, from the beginning (on horse-drawn tram lines) in 1808, up to the present time. Development in size is shown as well as in shape, the rail at the right (1910 model) being  $6\frac{1}{2}$  inches high. The hollow pear head appears in this series, dated 1860.

It is interesting to note in this development that by 1831 the T-headed, broad-based rail, in practi-

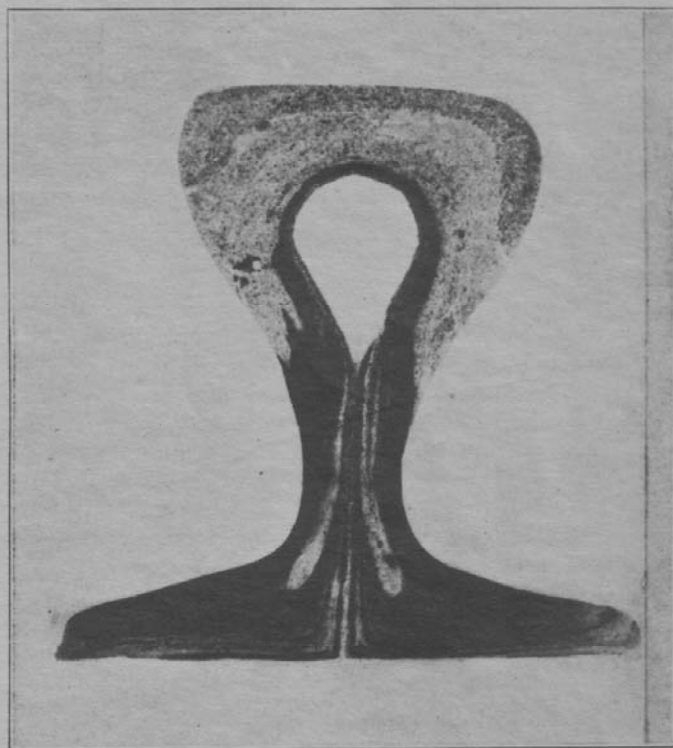


FIG. 282—SULPHUR PRINT OF OLD RAIL, DEC. 1920

This curious hollow-headed old rail was taken from the Harshman Siding of the Big Four R. R. near Dayton, where it was probably originally laid about 1860. It was rolled by the Cambria Iron Works of Pennsylvania, as roll records in their mill show, the metal being iron instead of steel, the latter metal not coming into use till 1865. The head was rolled hollow to save about 10 per cent in metal. The pear-shaped head is to reinforce the web of the rail against its tendency to bend, and thus permit one side of the head to lay down. See page 124.

condition weighs 57.6 lbs. per yard, the other is a hollow pear-shaped section and weighs 54.6 lbs. per yard.

Both rails proved to be made of wrought iron, and so are of the class of material in general use be-