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OHIO'S ENGINEERING FIRSTS

By GEORGE S. BONN

I. THE INTERURBAN

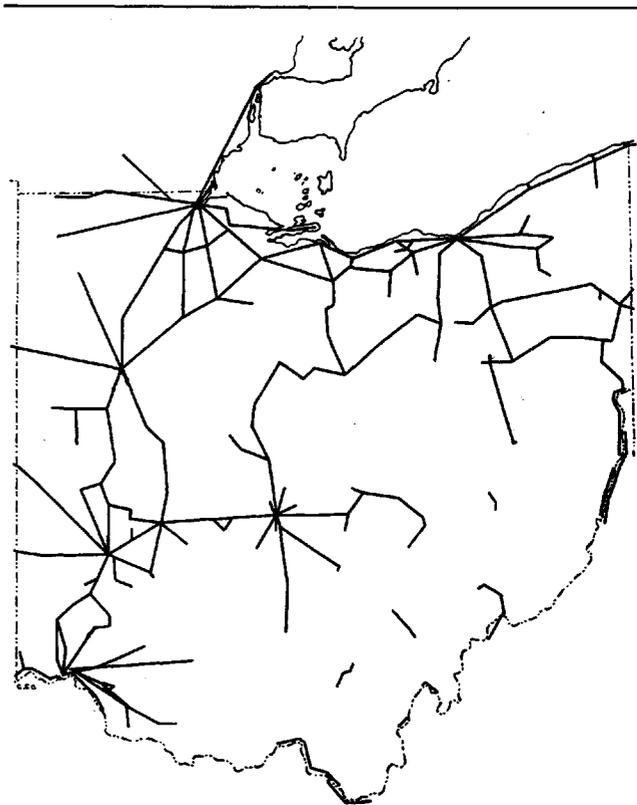
WHEN this little column was born, its godfather suggested that it be dubbed "Engineering 'Round About Ohio," with little subheads such as "Ohio Paves the Nation" or "Ohio Washes, Sweeps, Refrigerates, Insulates, Tires, or possibly, Electrifies the Nation." However, some other state might complain, or perhaps some loyal Ohioan would wonder why his pet industry was left out. Then, too, under what heading could interurbans come? It was here in Ohio that this now fast-disappearing mode of travel began and eventually reached its greatest development. So, after much dickering and dockering this brainchild was called "Ohio's Engineering Firsts" with the fond hope that too many people won't kick.

Electric Traction

The history of electric traction began about a hundred years ago in Vermont with the building of a small car propelled by a solenoid engine which worked something like a steam engine. The power was obtained from storage batteries brought along with the car for that purpose. Experiments were conducted in all parts of the country using this same system. Then, about 1860, the dynamo was invented and the electric motor came into being. Shortly afterwards inventors and experimenters all over the world began using this new power development to run small cars. One of the biggest difficulties encountered was the transmission of power to the car. Both third rails and trolleys were employed by different builders, some even using both. Among the third rail advocates were Stephen D. Field, C. O. Mailloux, F. B. Rae, and Leo Daft. Trolley enthusiasts were backed by VanDepoele, John C. Henry, Edward M. Bentley, Walter H. Knight, Sidney H. Short, and Frank J. Sprague. VanDepoele did more, technically, for the electric railway than any of the others, and many of his early installations were made in Ohio. It was on Bentley's line in Kansas that the name "trolley" was first used; the overhead movable system had been called a "troller," but the employes and the public liked "trolley" better, ergo, "trolley." However, it was Sprague in 1887 who laid the foundation for the modern systems of electric street railways by building a complete road in Richmond, Virginia. The Sprague system spread. America's street railways soon were electrified.

Ohio's Part

On July 27, 1884, three years before Sprague's vic-



OHIO'S INTERURBAN NETWORK
BUILT AND JUNKED BETWEEN 1886 AND 1936

tory at Richmond, Messrs. Bentley and Knight built their first electric road in Cleveland. Their car ran over about a mile of track of the East Cleveland Street Railway Company on a regular schedule and *hauled passengers for money*. Even though the operation was abandoned the following year, the Bentley and Knight car was the first to be electrically operated on the street railways of America on a definite schedule and for fare.

Professor Sidney H. Short had built an electric line on the campus of Denver University, where he taught, before he was called to The Ohio State University to become a member of the faculty in the Department of Physics. He was here just a short time, but it was long enough for him to design and supervise the building of an electric line from High Street to the Ohio State Fair grounds, a distance of about a mile. This Columbus Consolidated Street Railway Company with its two cars later became a part of the unified system that Columbus now has. Incidentally, this "Short" line, the first in central Ohio, was actually built by a junior at the University, one of Professor Short's students. This boy, John C. Lincoln,

became so interested in the work that he left school and went with Professor Short. This same boy later organized the Lincoln Electric Company which is still flourishing in Cleveland.

By January 1, 1888, the Lima Street Railway and Motor Power Company had in operation a four-mile electric line using eight cars.¹ These two lines in Lima and Columbus were the only two in Ohio of the thirteen electric lines operating in the United States on January 1, 1888. The total mileage for the country was 48.25; Ohio operated five of these.

By 1890 there were about eighteen miles of electrified street railway in Cleveland, nine and a half miles in Cincinnati, and varying amounts in other cities. The Akron Street Railway and Herdic Company was chartered in July, 1888; its twelve miles of main line using the Sprague overhead system of electricity were opened November 3, 1888. The Dayton and Soldiers' Home Electric Railroad Company, chartered July, 1889, opened its two miles of Sprague operated road on April 7, 1890; its two cars were appropriately numbered No. 1 and No. 2. The Piqua Street Railway Company had four and a half miles operated à la Sprague on January 15, 1890. The Hamilton and Lindenwald Electric Transit Company opened its three electric miles on December 17, 1890.

The Interurban, Another Ohio First

While all this city railway electrification was going on, the first intercity line was also constructed. On May 10, 1888, the Newark and Granville Electric Street Railway was chartered, the first electric line in the United States to connect two towns. The line, using the Sprague system, was opened on December 28 of that same year, running one car over its eight miles of track. By September 1, 1890, the full equipment of the company was in operation.

Now began the promotion and building of inter-city roads the like of which had not been dreamed. Unfortunately, however, there was much more promotion than there was building. Twenty-three electric lines were incorporated in 1891, nineteen in 1892, twenty more city lines in 1893, eighteen in 1894, and thirty in 1895. To be sure, many of those that were incorporated did not get any further than incorporation. The promoters blithely talked of the advantages of interurban lines, the people blindly turned over their money, and the promoters blandly walked off with it, leaving the shocked stockholders holding the proverbial bag.

But the fun had just begun. Twelve more lines were chartered in 1896, eighteen in 1897, eighteen in 1898, forty-two in 1899, thirty-three in 1900, and *ninety-six* in 1901. After numerous reorganizations and consolidations,

1. Charles Wells Reeder. *The Interurbans of Ohio*. Paper prepared in 1905-06. Mr. Reeder is at present the Junior Dean of the College of Commerce and Administration, The Ohio State University, Columbus, Ohio.

there were on May 1, 1901, sixty-eight companies operating electric railways in Ohio.² A little more than half of these were city lines.

Growth of the Network

In 1901 there were 868 miles of interurban lines operated in Ohio. Three years later the total was 1,937. The following year brought the total to 2,261 miles. From 1907 with 2,406 miles in operation there was a steady yearly increase until 1916 when there were 2,869 miles operated. In 1934 the interurbans of Ohio covered 953 miles. Last year they used about 700 miles of track. Slowly but steadily they are losing out, being pushed back by the automobile particularly.

The year 1919 was tops as far as number of passengers carried is concerned. A very rapid increase is noted up to 256,173,216 in 1919. In 1934, the Ohio traction lines carried 35,555,385. Draw your own conclusions.

To list all the roads that have operated in Ohio would take too much time and space; a filing card index of about three hundred is available if anybody is interested. Likewise, it would be impossible to put on a map all the individual names of the traction lines running in any one of the past forty years. Besides, it would take too many maps. The accompanying map, therefore, is composite—very composite. It shows all the lines that have ever operated in the state of Ohio between two or more towns. That is, it is supposed to show that. Most of them are like Clementine, lost and gone forever, but a few are still running, and, we fervently hope, will continue to run for years and years.

Notice especially the several centers of interurban operation. Cleveland, with its lines radiating in all directions (except north), was the terminus of many important roads. The A. B. C. of interurban traffic up there was the Akron, Bedford, and Cleveland Railway, incorporated in November, 1894, and opened October 26, 1895. Many people consider this road the first really inter-urban interurban, since its thirty-five miles of line connects several large towns. It later, in 1899, consolidated with the Akron Traction and Electric Company to form the Northern Ohio Traction Company, which, in 1901, bought the Akron and Cuyahoga Falls Rapid Transit Company. The whole business reorganized in 1902 as the Northern Ohio Traction and Light Company, popularly called the N.O.T. & L.—Never On Time & Late. By continued consolidations and absorptions this line eventually operated 189 miles of interurban road and 105 miles of city lines, reaching south to Uhrichsville through Massillon and Canton, east to Warren and Alliance, and west to Wadsworth. It discontinued operations in 1933.

The Lake Shore Electric Railway, incorporated in

2. Thirty-fourth Annual Report of the Commissioner of Railroads and Telegraphs (of Ohio) for the year 1901. J. C. Morris, Commissioner.

1901 as a consolidation of four other lines, is still leaving Cleveland every two hours for Lorain, Norwalk, Sandusky, Fremont, and Toledo. It used to go to Detroit and Lima, but times do change.

Toledo fostered many tractions, too. So did, as you can see, Lima, Springfield, Columbus, Dayton, and Cincinnati. The C. G. & P. (Cincinnati, Georgetown, and Portsmouth or Come, Get-out, and Push—either) was originally a steam road and it never came closer to Portsmouth than Russellville, forty miles away. For a while it ran, as did the Wellston and Jackson Belt Railway, freight by steam and passengers by electricity. After a reorganization or two, it was junked in 1934.

The line from Gallipolis to Point Pleasant, called variously Gal. & Pt. Pleasant Ry., Kanauga Traction Company, and Gal. & Northern Traction Company under which name it was junked in 1922, had an interesting career. The morning after the company had had a spat with the townspeople, the Gallipolitans awoke from a deep dream of peace to find the road torn out by the roots. After the previous day's trouble, the traction company vowed "they'd show 'em" (or something like that) and simply took up their tracks and went home. Several years later another company rebuilt the road and it was in operation until 1922.

Other sections of the state had traction lines, but they were not hooked into the network that covered most of Ohio as well as the surrounding states.

Ohio pioneered in this form of transportation. Ohio has been the leader or originator of many worth while enterprises. We hope to take up some of these others in subsequent articles.

The Toulmin Award

At the June (1936) Commencement exercises, George S. Bonn was announced as the winner of the Toulmin medal. Mr. Bonn was graduated in Chemical Engineering in 1935 and received the Master's degree in 1936.

The subject of the competition, "Concentration and Decentralization of Manufacturing Industries in the State of Ohio" was selected by Colonel H. A. Toulmin in order to provide encouragement to the study of the economic and social questions involved in a consideration of manufacturing and its relation to modern life. Also, this thought will be the basis for the selection of subjects for future competitions.

Colonel Toulmin, the sponsor for this new annual prize, is a graduate of the Ohio State University College of Law, class of 1913, and at present is practising patent law in Dayton. He is known for his many articles on economic subjects as well as for his books on patent law for engineers.