IN THE FIELD OF ELECTRICITY

THE year 1904 brings us to the quarter century mark since the Siemens company of Berlin first connected an electric motor to a truck and initiated the electric railroad. The car was crude and the railway a small affair, 350 yards long, and of three feet three inches gauge, the third rail being used. A species of sliding trolley on an overhead rail was invented two years later.

In 1885 Van Depole invented the under running trolley wheel, making feasible the use of overhead wire conductors, and Wellington Adams mounted the motor directly on the car axle—the practice up to that time having been to mount the motor on a separate frame and connect with the axle by chains or belts.

These two inventions, the under running trolley and the direct connected motor, are perhaps the only features in electric car designing which have survived the contest of changes and improvements in the equipment of electric lines.

In the early cars, relates the New York Sun, a couple of 15 horse-power motors were thought to be ample. Today an electric locomotive is in operation on the Baltimore & Ohio railroad, propelled by eight 225 horse-power motors, a total of 1,800 horse-power. The first cars built had a seating capacity of sixteen. Sixty is the number of passengers that can be seated in the latest designs.

In arrangements for long distance trolley lines, the middle west states are taking the lead. In Indiana five roads, each over 100 miles in length, are finished or in course of construction.

A 200-mile road is in operation between Columbus, O., and Indianapolis, equipped with sleeping and dining cars of the most advanced type. Extensions of this line are being pushed through to Wheeling, W. Va., and to Pittsburg, and plans are being made for connections with Cincinnati. This service in another year will cover stretches in various directions of from 200 to 500 miles in length.

Solid trains are run, consisting of sleepers, dining cars and day coaches, all of the most improved design and construction, the sleepers costing over $20,000 each. Staterooms with two berths are used, instead of open compartments.

The roadbeds and tracks are built as substantially as on steam roads, and a speed of sixty-five miles an hour is regularly made on some stretches. Indeed, the Chicago, Elgin & Aurora railroad is planning an equipment capable of 100 miles an hour for everyday schedule.

Trains leave the Indianapolis and Columbus terminals at 10:30 o'clock every night and finish the 200-mile run at 6 o'clock in the morning. The operation of the road has shown that there is no smoke, cinders or dust, and that sleeping car passengers will be able to open their windows in summer. The charge for a berth and fare between the two cities is $5, which is less than the day coach fare on the competing steam railroads.

Although in the eastern states the development of the electric railway has not yet reached a stage where sleepers and dining cars are in use, still the improvements in the equipment and fittings of the ordinary service cars are keeping pace with those of lines in other parts of the country. The Fonda, Johnstown & Gloversville railway has put on new palace cars, which are said to be the largest and most expensive ever seen.

They are fifty-five feet in length and weigh forty-three tons. High-back reversible seats, finished in plush, with roll headrests and footrests increase the comfort of the passenger. Each car seats fifty-six persons. Over each seat is an electric light, and the electric push button keeps the passenger in close touch with the conductor. A telephone connects both platforms, so that the motorman and conductor can talk with each other and also with the general offices of the company. The cars are geared to forty-five miles an hour.

Electricity and Steam Abroad.

A late number of the Railway News of London gives the details of the machinery and devices used in electrifying a division of the Northeastern railway, and the same number mentions five other electrification schemes, all covering the conversion of steam roads to electric operation. The London Daily News, in a late issue, has an interview with an official of one of the largest English railway systems, who is quoted as follows:

"Why is not electricity to be adopted?"

"We have never thought it necessary for long-distance traffic. In time it certainly will be adopted. At present, however, there is not the passenger traffic over long distances which would justify the enormous outlay of capital. But for local and suburban traffic it is rapidly being laid down. The Lancashire & Yorkshire railway has it for its Liverpool to Southport service, and the local Newcastle lines of the Northeastern are being electrified. Other London railways are only waiting to see the result of the electrification of the district. The Zossen experiments showed that a speed of 118 miles an hour could be made with electricity. But such speed would require a track to be reserved especially for it. The English railways could not afford that for the carrying of the few people who wish to travel at that rate."

"Wherein lies the special advantage for suburban traffic?"

"In suburban traffic the stops are frequent. With the multiple-unit system of electric trains a high rate of acceleration can be obtained, so that no time is lost in starting; a high speed is reached in twenty or thirty seconds. With electricity the trains can be increased or reduced, and, while there is in that way a saving of cost, there is no loss of efficiency. The heavy engine has its limits. It is practically certain that the saving on the working expenditure with electricity would be sufficient to pay interest on the capital outlay necessary for suburban lines. The great gain would lie in increased traffic facilities, and, therefore, increased receipts per train mile."

State Owned Trolley Line.

All construction work has just been completed on the new trolley line built by the state in Bismarck, N. D., and the first car will be run over the line March 1.

North Dakota is the only state in the union that owns a trolley line. Its length is 8,500 feet, and its course is from the railroad depots in this, the capital city, to the entrance of the state capitol. Its construction was authorized by the legislature of 1903 and the line has been built during the course of the autumn and winter. It was built under the direction of an electrical engineer employed by the state, with labor paid by the state. No contracts were let for its construction.

The matter of how it came to be is, perhaps, interesting, because of the novelty of a state's engaging in the transportation business on its own account. This capital city of North Dakota has a population estimated at 4,000, hardly enough to support a metropolitan traction line and to warrant rapid transit, or indeed to need it. When the capitol was located, twenty years ago, the magnificent distances of the western town were no greater than the magnificent expectations of its founders and boomers. In the enthusiasm of their expectations for the future of the city, they set the capitol upon a high hill, more than a mile from the business center of the town and the various hotels at which legislators and visitors to the city must put up.

The legislature of North Dakota meets during January and February, the months when the weather is most extremely cold, and when winter winds attain their greatest velocity and penetration. The matter, therefore, of transportation from the city to the capitol is a vital one for legislators, state officials, legislative employes and others whose business calls them at least twice each day to make this trip.

Traveling in carriages and omnibuses when the weather is below zero is not extraordinarily pleasant, no matter how comfortable the carriages may be made. Neither is walking always practicable. Therefore, said the legislators of the state in session assembled, "we will build a trolley line with the state's funds, to be operated on the state's account. It will serve both as a freight and passenger line. Coal for the heating of the building must be transported from markets in the city. Mail, express and other matter must be taken daily to the state house. State officials and employes must find their way to the building some way twice each day during the year. The trolley will solve all these difficulties and it will be built."

When North Dakota was admitted to the union a separate allotment of land was made by the government for the endowment of each of the state institutions. A tract of 82,000 acres, distributed through the state, was set apart for the erection of the capitol, other buildings and other necessary adjuncts to the administration of public business. This land was to be sold and the proceeds directly applied to the building of suitable administration buildings and their accessories. From this allotment of lands several thousand acres have been already sold, and from the funds in hand the legislature made an appropriation of $20,000 for the building of the trolley line.

At the same time a provision was made for the erection of an electric lighting plant and power house, from the general maintenance appropriation. The electric light plant was to furnish lights for the administration building and the power plant to furnish power for the trolley line. This plant has been completed and is now in operation.

The line will be operated by the state under a franchise granted to the state authorities by the common council of the city of Bismarck, which gives the state the right to operate a street electric passenger railway for a term of twenty years, with a maximum fare charge of 5 cents. The legislators and representatives of the state government will be transported free of charge. Citizens desiring to avail themselves of transportation privileges will be taxed 5 cents a fare. The line is in every sense a public transportation line, and the franchise is so drawn. Cars will run every hour over the route.

Country Telephones.

"Every progressive farmer should have a telephone," says Country Life in America. "He cannot afford to be without one. Time is money, and the telephone saves time. It is easier, quicker and cheaper to talk than it is to walk or ride. The time has arrived when we must realize the importance of being in touch with our neighbors and with the world.

"Communities should build their own telephone lines if they cannot get satisfactory service at reasonable rates from existing companies. It is a considerable undertaking, but the country is already dotted with independent telephone exchanges thus established which are eminently successful.

"The first thing to do in organizing a telephone company is to agitate the question and make the neighborhood understand its great value; that it is a good business investment, a public improvement, a distinct social advantage and a positive personal convenience; that a telephone in the house enables one to call a doctor without dangerous delay, to give immediate alarm in case of fire or burglars, to avoid a needless trip to town, to call the butcher, the baker, the grocer and to bring one into quick touch with the railroad, the telegraph, the postoffice or the bank. The telephone enables the busy farmer to transact business at the farm that would otherwise necessitate his absence from home. In a large measure it eliminates the only strong objection to farm life—isolation. With a telephone in the house the farmer's wife is never alone. Every subscriber is, as it were, in the next room. The best proof of its value is—the fact universal—that people who once have a telephone almost never have it taken out. The only objection against the farmer's having a telephone was by a man who wanted an excuse to go to town. He could not get any satisfaction out of a drink of whisky over a telephone wire."

Electricity on the Central.

Criticism which was elicited by one feature of the electrical program of the New York Central railroad has just received attention from two well known technical periodicals, the Electrical World and Engineer and the Engineering Record. Up to the present time practically all the electric traction work done in the world has been performed with a direct current. A number of experiments have been conducted with the alternating current of late. Some of these encourage the hope that this type of current may eventually prove serviceable, but it can hardly be said that all of the minor questions incident to its adoption have yet been solved. Under the circumstances the Central gave the preference to the direct current, and now one occasionally hears the suggestion that when its motors are in actual use they will be obsolete. For their approval of the Central's choice the technical journals present two cogent reasons. In view of the immense amount of traffic to be handled and the vast inconvenience which would result from a serious interruption, it is better to eliminate all doubt and uncertainty at the outset. Again, certain other railways—notably that in the subway—with which the Central will make connections have decided to use the direct current. It is desirable, of course, to have the rolling stock so equipped that trains from one road can be run over the tracks of the other and unnecessary changes of car by passengers averted. To the general public these considerations will appeal so strongly that it is safe to say that the Central's decision will excite almost unanimous commendation. The patrons of the road will unquestionably be better pleased to see a well tried system adopted soon than to be obliged to wait several years longer for the promised innovation. It is due to the Central to remember that it has already displayed a distinctly progressive spirit in several ways. The company is a pioneer in the substitution of electricity for steam on a large scale in this country. For its power stations it has ordered engines of the most modern type—the steam turbine. The electric locomotives which are to haul into the city its great express trains will likewise represent the latest advances in mechanism which have stood the test of actual service. Besides, if the time ever comes when the Central deems it expedient to introduce the alternating current, no formidable barrier to the change will exist. No important modification will be necessary in the power stations. Its dynamos would generate an alternating current anyhow, and the conversion of this into a direct current would then be discontinued. As for the motors—both those mounted on the trucks of the suburban cars and those employed to draw through trains—they could probably be sold without great loss. The future, therefore, can be left to take care of itself. The present is of infinitely greater importance.