

Electric Railway Modeling

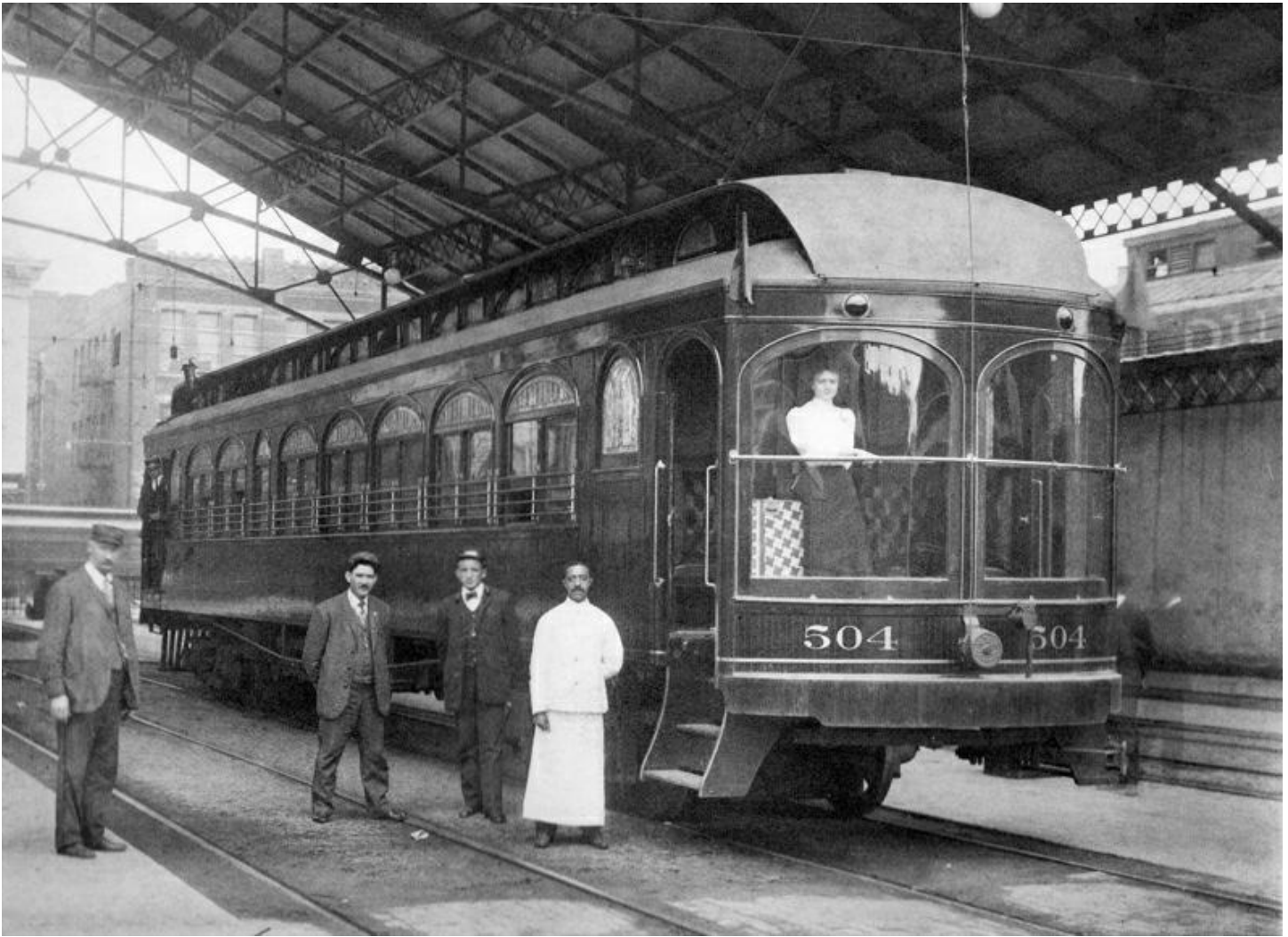
By Glenn Guerra

When I was in high school, I would go to the Illinois Railway Museum a few times in the summer to work on the trains. It was 1964, and my mom would drive me there. She would paint pictures or something while I worked on the trains. That was right after the museum had moved to Union, Illinois from North Chicago, and they were just getting started in Union. I remember that one of my first tasks was to attach guy wire to the ceramic insulators for the overhead trolley wire. I was 14 at the time, and this was my first real experience with electric railways. My hometown of Barrington, Illinois had a C&NW line and the EJ&E running through it, and those were my railroad interests. A few years later, my buddy and I were building an HO layout in his basement, and we would go to a hobby store in Des Plaines, Illinois. While talking to the clerk in the store one day, he mentioned the North Shore line being recently abandoned. I did not even know it existed, and it was only 25 miles from where I lived. My buddy and I also went to the Elgin model club which is located in the old Clintonville substation for the Chicago Aurora & Elgin electric line. Not only did I not know these railroads existed, I did not much care at the time. Well, next came college, race cars, work, partying, and the rest of life. I ended up back in model trains around 1980, and around 1989, really jumped back in. I started doing wood work in 1983, and in 1985 did a job for the Mid-Continent Railway Museum in North Freedom, Wisconsin. The amount of museum work grew, and in 1994, I was hired by the Illinois Railway Museum to rebuild a 1906 wood interurban car. Since I knew nothing about electric railways, I started looking around to see what I could learn. I eventually did a lot of work for various electric railway museums, and learned a lot about the industry, as well as, meeting many modelers. What I found was a fascinating industry with a lot to offer a modeler. Here, I want to present an introduction to electric railways, along with what they have to offer the modeler. I will touch a little on the history and variety of the industry, where you can get some information, and some of the appeal electric railways have to a modeler.

The Electric Railway Industry

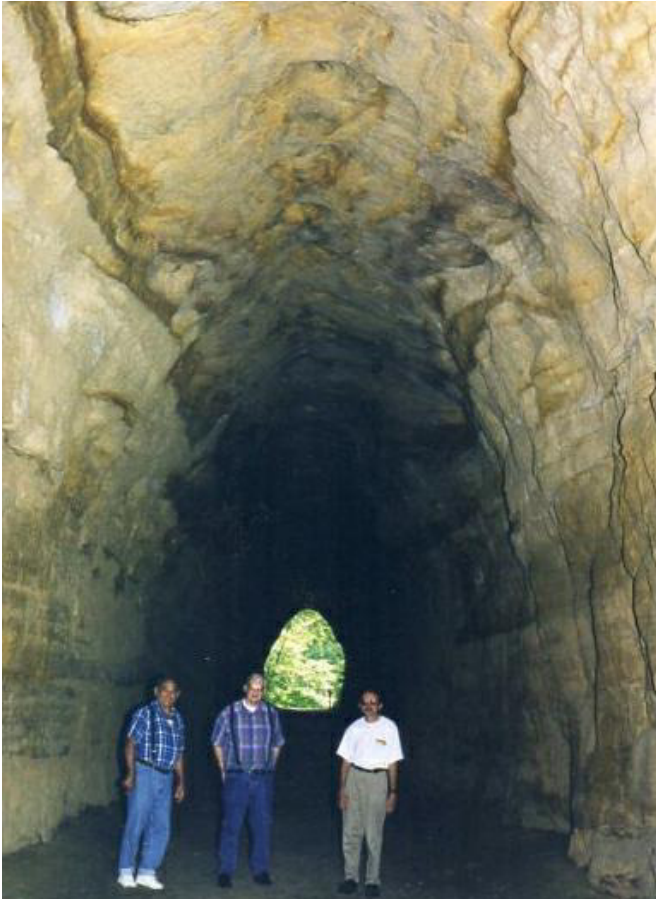
The first street railways had small cars pulled by horse and were common in cities as early as the 1870's. I read a book by Saunders Norvell about his life in the hardware business. The book was written in 1924, and is titled *40 Years of Hardware*. The author talks about growing up in St. Louis, Missouri in the 1870's, and riding the horse drawn street cars. He said in the winter there was hay in the car so you could put your feet in it to keep warm. The electric railway industry got going in the 1890's. This is close to the beginning of time for electric anything. The Chicago World's Fair of 1893 settled the dispute between alternating and direct current for lighting. There were kits offered and many of the small horse cars were converted to electric cars. These early lines were predominantly city lines with short runs. Around 1900, the lines started to reach out into the countryside. They soon connected smaller communities with larger ones.





This is an often reproduced photo of the Ft. Wayne and Wabash Valley electric car train in the Indianapolis, Indiana terminal. The photo was taken in 1906 shortly after the car arrived on the railroad. This was a 60' car, the largest car made by Cincinnati Car Company up to that time. The car had a small kitchen, and served meals on the trip from Indianapolis to Ft. Wayne. The car had a smoking room at the front, a coach section, and an observation room where the lady is standing. This was the electric railway trying to compete with the steam railroads for the long distance luxury traveler. Bass Photo Collection from the Indiana Historical Society.

Where I live, the Sheboygan Light, Power and Railway Company reached Plymouth in 1905. It was possible to go 15 miles to Sheboygan, and be home the same day. The street car companies were becoming interurban lines, and a whole new industry bloomed. The new interurban lines had connections with the city street car lines running over the city tracks to terminals in the middle of towns. They could take you right to the place you wanted to go. While we were rebuilding car #26 from the Sheboygan Light Power and Railway Co. in Plymouth, a lady came forward with an old wooden egg crate. She said her mother would take her from Plymouth to Sheboygan with the 12 dozen eggs. The interurban ran down 8th Street, right by Prange's Department Store. Her mom would trade the eggs for goods at the store, and they would then ride home on the interurban. The 30 mile round trip does not seem like much today, but riding the interurban was like light speed compared to walking. Around the country, connections were being made with other companies building from other cities, and the whole industry exploded. Investment money came in, and small lines were consolidated into larger systems. The electric railroads were pulling the local passenger business away from the steam railroads. The cars were getting larger, faster, and more lavish, and starting to go after the long distance traveler. The Ft. Wayne and Wabash Valley purchased four cars in 1906 to run a first class limited stop car from Ft. Wayne, Indiana to Indianapolis, Indiana. The car featured meals, a smoking room, baggage room for express



Yes, electric lines even had tunnels. This one is in Ohio. I was on an outing with Tony, Bill, and Art to look over remnants of old lines. This tunnel is located in a park, and the right of way is a walking path. Note the holes in the ceiling for the trolley wire hangers.

packages, and an observation room at the rear. In 1910, you could go from Plymouth, Wisconsin to New York City by electric railroad with only one small segment in upstate New York missing. Also, at that time, there was a nine track terminal in Indianapolis, Indiana, and you could go twelve different directions on electric railways. The Midwest saw the greatest boom, but they were not the only ones building. There were electric railways in all the lower 48 states. By 1916, the industry reached the peak amount of miles built per year. The automobile was getting affordable and common, making them even more convenient than the electric railways. In 1927, the federal government started to appropriate money for highway construction, and that was

The St. Charles street car line in New Orleans is a must ride if you want an old time traction experience. Be sure to ride it to the end. When you get to the corner of St. Charles and Carlton, stop and go up on the levee to watch the boats go by.





This was part of the O Scale display layout at the National Capital Trolley Museum before they moved. This model would run all day when the museum was open. Note the curves.



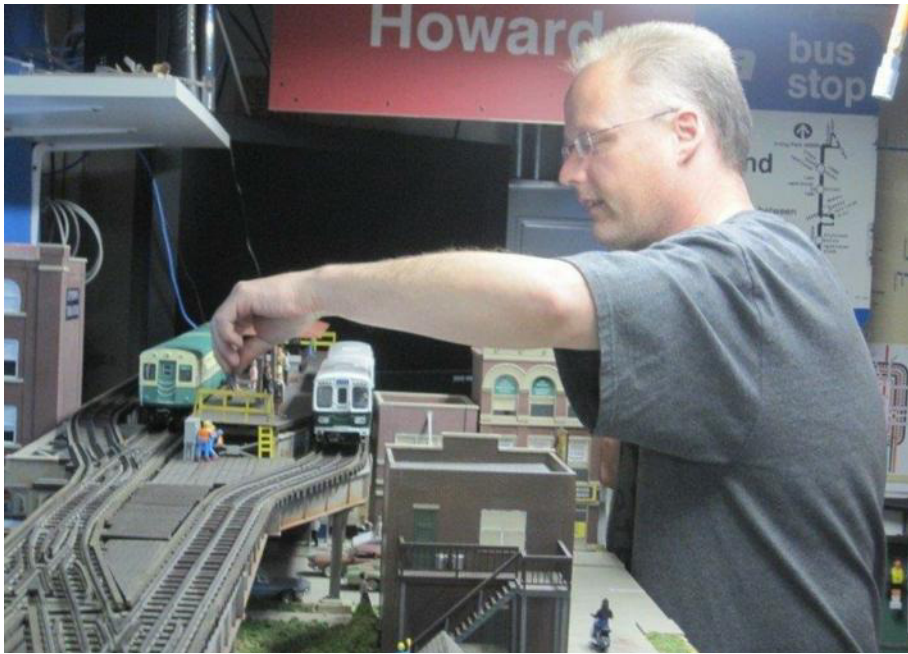
A scene on Ed Halstead's layout with a train of North Shore Line Silverliner going by. If you are not familiar with these cars, the fluting was painted on the flat side of the car to look like stainless fluting. This was done by masking a line, and spraying the paint on the line, leaving a hard line. When you pull off the masking, it fades away to nothing. This is a trick that hot rod painters have been using for a long time.



Ed Halstead, in the yellow shirt, hosting a group of modelers at his layout. [Ed has a blog here.](#)

the final blow. The depression of the 1930's saw lines closing and even more consolidation. The once great industry was now only a few commuter lines, terminal lines, and the city street car lines. But, it did not die. A few lines hung on and are around today; and many new lines are being build under the name of "light rail".

Almost all of these early lines generated their own electricity because there was none to buy. As the lines reached out into the countryside, they started selling electric to people along the way. A big problem for them was having to transmit the electric over long distances. Most electric lines ran on 600 volts direct current, and this does not transmit very far through the trolley wire. When you take a ride at a museum, pay attention to the brightness of the lights in the car. At the end of the line, they will dim when the car is started. This is because the resistance in the trolley wire is dropping the voltage which causes the lights to dim. The amount of voltage drop will go up as the amperage draw increases, so a two car train starting will dim the lights more than a one car train will. I remember reading one article from 1905 about a line in Indiana transmitting power 150 miles, and this was a big deal. One of the ways to do this was to transmit high voltage power and step it down into low voltage power at a substation. Another feature was to have a large feeder wire running on poles alongside the right of way that would be connected to the trolley wire. The large feeder would have less resistance, and could transmit the power a longer distance. Once the electric railway lines started selling excess electric, they started becoming electric companies. Where I live in Wisconsin, WE Energies was Wisconsin Electric, which was once The Milwaukee Electric Railway and Light Company. Alliant Energy in Sheboygan was once



Wisconsin Power and Light, which was Sheboygan Light Power and Railway Company before that.

Once the electric railways started to touch each other, interchange between them became possible, and they had the same problems that the steam railroads did during the Civil War. The steam railroads formed trade organizations to develop standards so everyone's equipment would work on all other railroads. The steam railroad organization was the Master Car Builders Association or MCB. The electric railway organization was the Central Electric Railway Association or CERA. They developed some standards that made the electric railways

Terry Gaskin models the Chicago elevated in 3 rail O Scale.



A view of one of the elevated platforms on Terry Gaskin's 3 rail layout. The structures are all scratch built and designed to take the 3 rail track.

compatible with steam railroads so the electric lines could now haul steam railroad cars. The CERA also developed some standard car designs in an attempt to reduce costs, as well as, making the cars interchangeable.

What Electric Railway Modeling Has To Offer

Electric railway modeling has some unique things to offer a modeler. Probably the biggest offering to the O Scale Modeler is the short radius curves. Because interurban railroads ran on city street car tracks, they had to



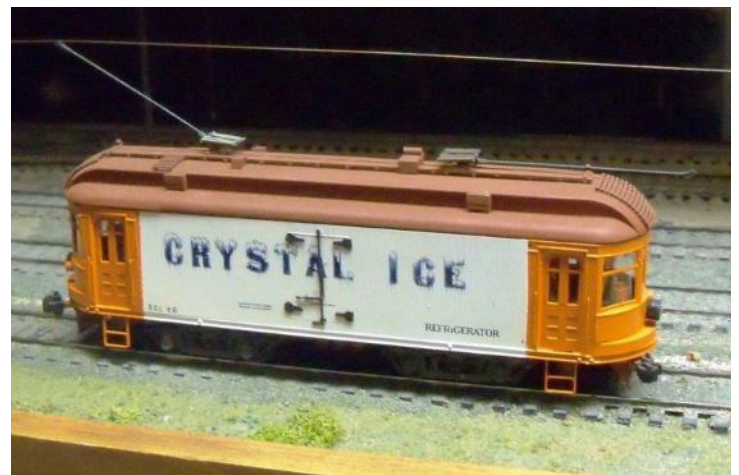
be able to negotiate 35' radius curves. That's 8-3/4" in O Scale. A USRA heavy Mikado was rated at a 370' radius curve which is 92-1/2" in O Scale. Very few people have 92" radius curves on their layout. With electric railways, you can have prototype radius curves. When you think of running a 60' car around a 9" radius curve, it seems like it is not possible. On the prototype, they said you could look out the window and see both rails when you went around the curve. You can fit your railroad into smaller spaces. You also have the advantage of modeling equipment in a larger scale without needing a lot of room.

Many electric railways were single track operations with passing sidings. You do not need a lot of track to model an electric railway. They varied from city running to country running, so you have some options on scenery. The right of way was usually not graded very much, and the roadbed followed the terrain a lot. Grades are usually not a problem since most of the cars were powered. On the lines that handled a lot of steam road cars, the grades could not be as steep as the lines that had only self propelled cars on them. The trains were shorter, so passing sidings do not need to be long.

This is Terrell Colson's layout during a get together at his house. You can see that the layout does not take up a lot of room, and there are loops at each end.



Terrell Colson on the right talking to Walter Keevil during a get together at Terrell's house. Note the size of the loop at the end of Terrell's layout.



Traction companies had a variety of equipment so you can find something you would like to model. Much of the equipment was homemade by the company, therefore, if you prefer free lance modeling, you will have a lot of fun with electric railways.



A Chicago Aurora & Elgin train stops for passengers on Ed Heerd's layout. Ed's layout is a dog bone arrangement that Terrell Colson used as inspiration for his layout. There is lots of modeling in a small space.

Since steam railroad cars were handled on many of the lines, you can mix equipment. You don't need to give up on steam railroad equipment because you want to model an electric railway. When the Western Pacific Railroad made it to California in 1910, it was easier to buy the electric railroads and use them as branch lines, rather than build new branch lines. The trains looked like steam railroad trains with electric engines pulling them. The Illinois Terminal railroad hauled mostly steam railroad cars with an occasional car built as an electric railroad car. These freight trains ran right down the street in many small towns.

Believe it or not, it is easy to wire an electric railway. There are no problems with reverse loops or frog polarity. All the track is wired together, and the trolley

wire, or third rail, is the other side. You don't even need block control for your yards. To take the power away from a car, just lower the pole like was done on the prototypes. To my knowledge, no one has made a sound decoder yet for electric cars, but that will happen. For now, you just need 12 volts and an old fashioned power pack.



Phil Spencer's layout in Toronto has a lot of PCC cars. Toronto was one of the last cities to run a large fleet of these cars.



Phil Spencer from Toronto engaged in conversation with other traction modelers.

Power trucks were made in miniature as far back as the 1950's, and there are a few varieties on the market today. This gives you much greater swing on the trucks, and the ability to detail the whole interior.

Lastly, there is the availability of equipment. There are a lot of products available for the electric railway modeler, but you need to did a little deeper. The good news is you don't need a lot of it.

Where Do You Find Information

To start this section, we should go back to the Central Electric Railway Association in the late 1930's when the electric railway industry seemed to be just hanging on. The railfans descended on them. Fan trips were organized just like the steam excursions. The electric lines were all too willing to accommodate the fans for the extra revenue. The fans formed a group, and used the CERA initials. They called themselves the Central Electric Railfans' Association <http://www.cera-chicago.org/>. The organization is still around, and is noted for publishing many very good books on electric railways. Whatever



George Kanary's Chicago Surface Lines layout. Note the railfan taking photos of the equipment.



George Kanary, on the left, chats with Phil Spencer during a get together at Terrell Colson's house.

East Penn Traction Club. They hold a bi-annual meet <http://www.eastpenn.org/>. The trade room at this meet is filled with prototype items and models. This is also a good place to meet people of like interest.

Another source of information is the many electric railway museums around the country. Besides being a source of information, the rides are interesting.

A North Shore car rounds the curve on Tom Froelich's layout. Note the tight curve that is prototypical for electric lines.

line or region you would like to model, the CERA has probably published a book on it. One of these books will give you some very good information. Another source I would recommend is the Hoosier Traction Meet every September in Indianapolis. The original founders of the CERA started having reunions in 1983 led by Dr. Howard Blackburn in Indianapolis, Indiana. These reunions grew into the Hoosier Traction Meet. The focus of the meet has become history presentations. For three days, there are presentations on electric railways, past and present. During the breaks, there is a trade room open with prototype ephemera and models. This meet is a good place to make connections, and acquire information for your models. Another good source is the





Tom Froelich, in the white shirt, talks with Rich Nielsen and Ralph Nelson. That's Tom's layout in the back, again showing you do not need a lot of room to model traction.

Electric railways had their own unique sounds. When sitting, the electric air compressor for the brakes will start and chug along. A few hits on the bell, and you are off. The straight cut gears growl, and the car creaks. The PCC cars are sprung so soft that it feels like getting on a boat when getting on one. Besides the museums, some cities still operate old cars as attractions. The F line in San Francisco is run with vintage equipment. This is a great ride for getting the feel of what went on. My favorite is New Orleans on the St. Charles Street line. This line has been in operation since 1837 as a horse drawn line. The cars run on it today were made in the 1920's. The hurricane brought down the overhead wire and some of the trees, but the cars are still there. The line goes by Audubon Park and Tulane University. At Carrollton street, the cars turn off of St. Charles Street. There is a college hangout on the corner that sells a dozen different kinds of daiquiris. Get yourself a 12 oz one, and walk up on the levee.

Have a seat in the grass, sip your drink, and watch the boats go by on the river. Life is good.

The electric railway industry had publications that were directed specifically to the industry. *Electric Railway Review* and *Electric Railway Journal* were two of the more popular ones. Both of these magazines are available on CD by sellers on eBay. The scans are good, and you will find articles about your favorite line. In 1911, there was an *Electric Railway Dictionary* published like the *Car Builders Cyclopedias* of the steam railroads. There are many plans in the book, and it is a good source of other information. Not many detail plans have been saved, but many of the proposal plans have been saved. The Cincinnati Car Company plans are located at the Indiana Historical Society, as well as, the builders photos. The Indiana Historical Society also has



This is a North Shore line station being built in Racine, Wisconsin by James Rindt. James is a young modeler, and all of this was gone long before he was born. Not only is this a good model, it's a good research effort.

the Bass Photo collections. Bass was a commercial photography house that did a lot on the electric railways. When I was working on the Ft. Wayne and Wabash Valley car for IRM, I went to the Indiana Historical Society to read the local newspapers, and found a lot of articles related to the car I was working on. I would assume other historical societies with newspaper archives would also be of help.



Another example of some of the nice work being done with traction models. These are being made by Mike Slater of Racine, Wisconsin.