

A Conversation with Samuel Insull

On April 1, 1910, your Managing Editor sat down with Samuel Insull to have a conversation about the "traction load" and its impact on the electric utility business.

It was a fascinating discussion as Mr. Insull, who has been referred to as Thomas Edison's principal apostle for central generation of electricity, outlined his business strategy.

Young man, you certainly were persistent in your calls to my secretary to schedule this meeting. Truly, I did not believe that I had time to talk with you until I learned of your desire to discuss the traction load.

This is my son, Sam Jr.; I call him Chappie. Chappie is very interested in electric railways, so I thought that he might listen and learn

from our conversation. I would not be a bit surprised if one of these days Chappie goes out and buys his own interurban so that he will have a full-size electric train set with which to play.

My formula for the electric utility business is transit contracts, large generators, low rates, and load management applied profitably, especially to outlying districts of the city. This belief goes back to my days with Thomas Edison and the very early days of the General Electric Company. Based on my experience to date here in Chicago with the Commonwealth Edison Company, I could not be more convinced that this is the formula for success in the electric utility business.



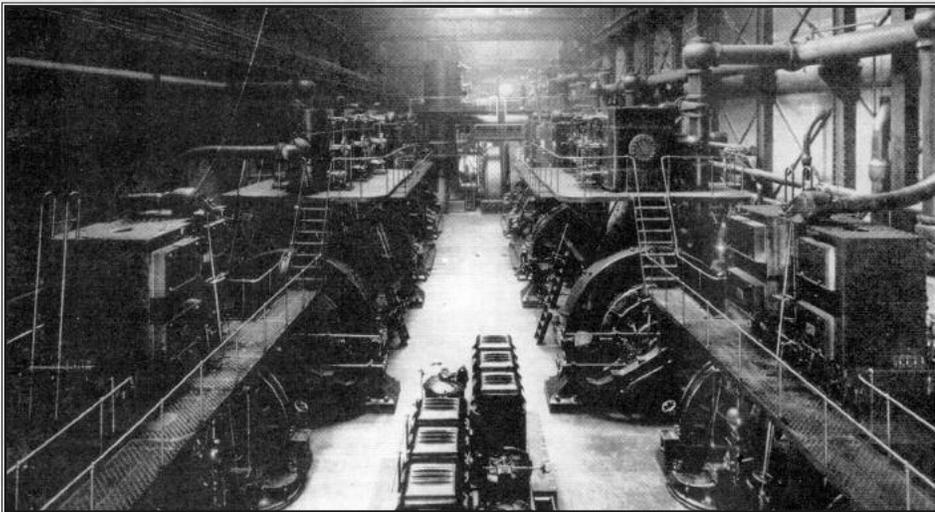
Samuel Insull, Commonwealth Edison

Last year, 1909, the traction load was twice the size of all of our other customers combined. Traction companies are the base load that allows Commonwealth Edison to continue to develop its generating capacity. As we increase the size and efficiency of our generating capacity, we lower the cost to produce a kilowatt of electricity. For example, the turbines in the Fisk Street Station use much less coal per kilowatt than the steam generators in the Harrison Street Station. There are also other benefits such as less smoke from burning less coal, which is of great interest to the politicians here in Chicago.

I think that it would be helpful to review some of the significant events in the development of the traction load as to why I am so convinced that my formula for the electric utility business is correct. When I came to Chicago on July 1, 1892, the electric utility industry was in its infancy. There was a hodgepodge of companies generating electricity for their own use along with a number of small companies generating electricity. Adding to this mix were the city aldermen forming shell companies alleging to compete when their real interest was a payment to go away. This practice was known as paying boodle.

There were three large companies in Chicago; the Chicago Edison Company of which I was becoming the president, Commonwealth Electric Company and the Chicago Arc Light and Power Company. Ultimately I acquired the Arc Light company and merged Edison and Commonwealth to create the Commonwealth Edison Company. Mr. Marshall Field loaned \$250,000 to me so that I could purchase stock in the Chicago Edison Company upon my arrival in Chicago.

The upcoming Columbian Exposition (Chicago World's Fair of 1893) and its Intramural Railroad that was planned to demonstrate the application of electricity to move large numbers of people was a very attractive proposition. Ultimately over 5,000,000 people were moved by that railway.



Above The Harrison Street Station was Commonwealth Edison Company's largest and most efficient station in the 1890s. This is a view of the station's engine room as it appeared shortly after the turn of the century. *Photo from The Sargent & Lundy Story*

Below While operation of the Intramural Railway may have been incidental to the overall operation of the World's Columbian Exposition in 1893, it certainly was not incidental to the General Electric Co. or the advance of electrically-power railways that are heavier than streetcar systems. This four-car train is stopped at the Colonnade station which adjoins the Penobscot Indian settlement exhibit. *Bruce G. Moffat collection*



This confirmed my suspicions that the street railway business would be of great interest to my business plans.

A month before I became the president of Chicago Edison, the Alley "L" opened between Congress and 39th St.. In May of 1893, they finally reached the fairgrounds at 63rd and Stony Island. However, their management was not willing to take the risk of electric operation, so they chose steam instead. A bankruptcy two years later and the desire to reduce costs in the ensuing reorganization created a wonderful opportunity for my friend, Frank Sprague.

I must mention two men who have been instrumental in our success; L. A. Ferguson, my chief engineer, and Frederick Sargent, my consulting engineer. Fred is a mechanical guy, and he was involved in the Pearl Street Station project in New York City. This was the first steam-powered generating station in the world. His partner, Ayres Lundy, is an electrical guy who worked with Frank in Richmond (Virginia) when they demonstrated that street railways could be successfully operated by electricity. I know Lundy from his days at General Electric. Lundy was a

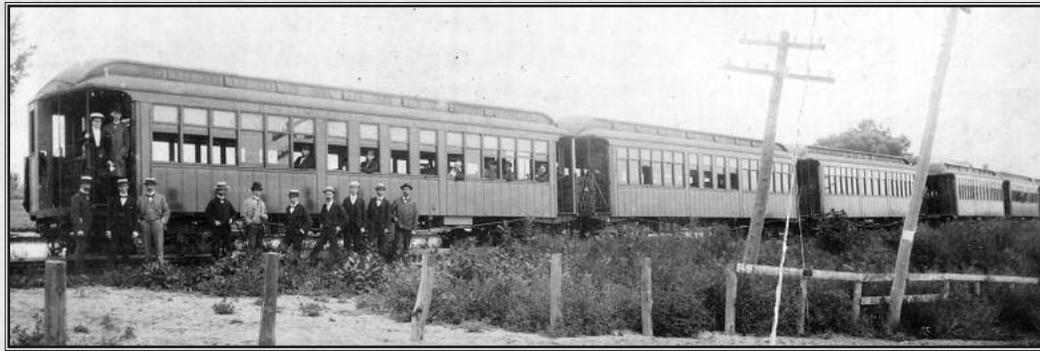


Ayres D. Lundy,
Sargent & Lundy photo

prominent consulting engineer in the electrification of rail operations including the Intermural Railway, South Side Elevated and Metropolitan West Side Elevated, among other properties.

Our first collaboration with Fred and Ayres, and the first really big assignment for their firm, Sargent & Lundy, was the design of the Harrison Street station in 1892. Being on the Chicago River, this became the largest steam-powered station at that time. It was also the most economical plant due to its generating capacity, which confirmed my assumption that bigger generating plants meant more efficiency. The roar of all of those reciprocating engines was something else and did they ever pound the concrete pedestals on which they were mounted.

Early in 1897, Sargent & Lundy was engaged by the South Side "L" to supervise an electrification project that included a generating station near 39th Street. Fred Sargent prevailed upon Frank Sprague to review the firm's recommendation to the South Side company. The Lake Street company and the Metropolitan were electrified, and their operating costs were less than operating with steam locomotives.



Testing of the first commercial use of "multiple distributed power" is underway on July 26, 1897, at the General Electric facility in Schenectady, New York. Frank Sprague, the first person on the left on the ground, was reluctant to accept this assignment because of the business risks inherent in such breakthrough technology. According to some sources, Ayres Lundy convinced Sprague to accept the project. *Krambles-Peterson Archive*

Sprague generally agreed with the recommendations; however, he was concerned with the railway's motor equipment (locomotive cars pulling numerous trailers). Viewing this as a serious problem, he made what he called a "radical recommendation; multiple distributed power." His advice was endorsed by Sargent & Lundy. One year later, the South Side Company was electrified. We now have multiple unit systems throughout the country, which is a great boost to the electric generating business.

Sprague was a genius when it came to inventing things, and he was a demanding taskmaster. Of all things this multiple unit concept came from his work on elevator control systems, which are another boost to our

electric business.

I wanted more generating capacity as our business was growing, and I wanted to continue to reduce the rates to our customers so we would get even more business. In 1902, I had made a contract with the Lake Street company to provide their electricity. They were purchasing power that was excess capacity from the other elevated railways, and that capacity was disappearing as business grew on the other elevated lines.

The elevated railways and the street railway companies were producing their own power in a not very economical manner. There was the possibility of getting all of this business. To get this business, I needed to produce electricity on a very large scale at a very low cost. Those



On April 17, 1898, two days after the first electric "multiple distributed powered" train operated over the length of the South Side Elevated, Frank Sprague is standing behind the controls of a car in the 61st Street yard. The South Side was the only elevated company to operate steam-powered trains on the Loop. *Ralph D. Cleveland/Bruce G. Moffat collection*



Fisk Street Station as it appeared while under construction in 1903. The general construction is of steel covered with red pressed brick and ornamented with heavy cut Bedford stone. *Photo from The Sargent & Lundy Story*

engineers at General Electric used their slide rules to prove that everything was impossible. Even Fred Sargent told me it couldn't be done. We were at the practical capacity of reciprocating steam engines. We needed a bold solution, and I was prepared to go to the directors with a bold solution. The business was there if we could provide a low rate.

So I dispatched Ferguson and Sargent to Europe to study the turbine installations in



Frederick Sargent who was also one of the incorporators of the Northwestern Elevated. *Sargent & Lundy photo*

various countries and report back to me. Charles Coffin (president of General Electric) did not want to take the risk of manufacturing 5,000 kilowatt units. I persisted, and we negotiated a compromise. General Electric would build the units and take the risk that they would

operate, and I (Commonwealth Edison) would pay for the installation.

On June 25, 1902, we broke ground on a 16-acre parcel along the South Branch of the Chicago River at Fisk Street, about a quarter mile west of Halsted Street. I will never forget that date. I was as nervous as I could be throughout the construction. We were taking

a huge risk building the world's largest turbine plant. Huge amounts of water would be needed as each turbine would be served by eight boilers. The condensers alone were a significant challenge.

The boilers are four in a row with a firing island between the two rows of boilers. Separate boiler and turbine rooms would be located under a common roof. The switch house would be separate, 50 feet from the main building. Boiler pressure was designed at 180 pounds per square inch, with the steam superheated another 150 degrees Fahrenheit and the turbines rotating at 750 rpm. We were really breaking new ground, and it would be the first 5,000 kilowatt unit placed in service.

On October 21, 1903, Sargent was superintending the steaming up of the unit. It made a terrific noise when it first started, and Sargent suggested that I leave. I inquired, Fred, what do you think is going to happen? He did not know but was concerned that there might be an explosion. I told Sargent that he should then leave as well. His response was that it was his duty to stay. My response was that I would stay, because if he was going to be blown up, I would prefer to be blown up with him since, if the turbine failed, I would be blown up anyway. It worked, and I immediately ordered two more units.

My men went to the elevated railways and got their business, and we got the street railway business as well. While we sold a lot of electricity, we had to be very careful in collecting our bills. The elevated railways were in

constant financial trouble, and I do not know why people ever invested in them. It would be crazy to expect that they would pay a dividend. We may have to make a financial investment in those companies. We are working on a consolidation plan as we speak. The Lake Street company is a challenging situation. It looks like I may have to get personally involved.

The street railway companies were a bigger financial mess, and Arnold has his hands full over there at the BOSE. (Bion Arnold is the Chairman of the Board of Supervising Engineers, Chicago Traction—See Wire Report.) While we have great interest in seeing these street railway operations succeed, I do not want to get involved as there is more than enough for me to do in the electric business. Arnold is doing a good job, and he will be involved with a reorganization of all those companies under a common operating company.

About two years ago, I purchased a farm near Libertyville. Mrs. Insull and Chappie spend a lot of time there. However, I am consumed with my work. A year ago last summer, while Chappie and his mother were traveling in Europe, I bought one of those new machines (automobile). When I bought the farm, there was no electricity, so I ran a line for the six miles from Lake Bluff to Libertyville. While out driving around in that very peaceful countryside, I began thinking, why not link up the various power stations that comprise North Shore Electric, which I own as well.

Then I was thinking about the interurban, the Chicago & Milwaukee Electric, that came to Libertyville in 1902. They have their own power plant in Highwood. North Shore Electric has power plants in Waukegan and Highland Park. Why couldn't I do the same thing in Lake County that I am doing in Chicago? We conducted a thorough survey of the area last year. There are 22 towns well back from the towns along the lake. Ten of those towns have electric service, but only one has service at night. The sheriff is constantly at the door of these small power plants as they are so financially insecure. Why not serve them with a central station and interconnecting power lines?

These areas are sparsely populated today, so it is a long-term situation. The interurbans can connect them together, and we can sell power to the interurbans as well as the farmers and the residents. My brother, Martin, is doing that very thing in the New Albany, Indiana, area down near Louisville. On thing we are going to have to deal with is that about two years ago the Milwaukee interurban went into bankruptcy before they ever reached Milwaukee. Some of my boys are already looking at that situation as the Illinois communities that the interurban serves have very wealthy residents who could use a lot of electricity.



The Libertyville station of the Chicago & Milwaukee Electric is on the east side of Milwaukee Avenue about three miles north of Insull's residence. He owns half of the land between the two points. The railroad's transmission line is a link in the first electrical distribution grid in the United States. Insull conceived the idea of a grid, to link remote locations, while driving around the vast open spaces in Lake County, Illinois. *Krambles-Peterson Archive*

One more thing, and then I must run along. I have spent a lot more time with you than I intended, and my secretary will be in here shortly to move me along. In many industrial plants, we have replaced steam-powered machines with electric-powered machines. It sure does help the City of Chicago with its smoke problem. The city is hard after the Illinois Central to convert their trains within the city limits to electric power. We are very interested in helping them do just that; electrify.

Those boys over there at the Illinois Central just do not get it. They are fighting the city tooth and nail (see Wire Report). I have two predictions. First, we will be selling a lot of electricity to the Illinois Central, and we will help them with their distribution system. Second, just as industry has replaced steam with electricity, the railroads will replace steam with electricity. The electric motor is much more efficient than the steam engine.

I must go now. Thank you for allowing Chappie to join us. Come along Chappie, your mother will be wondering what we are doing.

This conversation was written from the following resources:

A Spirit Capable
The Story of Commonwealth Edison
John Hogan
The Mobium Press, 1986

Before The North Shore Line
The Early Years 1894-1916
By Edward W. Tobin,
Central Electric Railfans' Association 2008

The Electric City
Energy and the Growth of the Chicago Area
1880-1930
Harold L. Platt
The University of Chicago Press, 1991

Insull
By Forrest McDonald
The University of Chicago Press, 1962

The Memoirs of Samuel Insull
An Autobiography
Edited by Larry Plachno
Transportation Trails, 1992

The "L"
The Development of Chicago's Rapid Transit
System 1888-1932
By Bruce G. Moffat
Central Electric Railfans' Association, 1995

The Sargent & Lundy Story
By Alf Kolflat and Robert W. Patterson
Sargent & Lundy, 1987

Frank Julian Sprague
Electrical Inventor & Engineer
William D. Middleton and
William D. Middleton III
Indiana University Press, 2009

Based on what happened subsequent to 1910, we could not resist making a few "tongue-in-cheek" predictions.



Locomotive 1409 is a part of Illinois Central's initial fleet designed exclusively for suburban service. Some mainline engines have been converted to tank-type locomotives to supplement the fleet as passenger traffic grew. American-type (4-4-0) locomotives are assigned to the suburban service to haul the heavier and longer distance trains that operated to Matteson where higher speeds are involved. *Illinois Central photo, Norman Carlson collection*