

IN THE FIELD OF ELECTRICITY

Electricity Ousting Steam.

WHILE in New York recently adjusting the wage scale for motormen on subway trains, Warren S. Stone, chief of the Brotherhood of Locomotive Engineers, had some interesting things to say concerning the increasing use of electricity as a motive power and the possibility of its supplanting steam power in long distance railroading. In an interview in the New York Sun Mr. Stone is quoted as follows:

"So far as suburban traffic is concerned, electricity as the motive power of trains will soon be here. I should imagine it will be little more than a question of a few months before most of the suburban railroad trains will be moved by electricity.

"It has distinct advantages over steam for this kind of work. It admits of running faster trains and more trains, for one thing. With one or two car trains there may be maintained a schedule based on a very short headway. Trains can be run thirty minutes apart, or even less if desired.

"I do not doubt that practically all the suburban service from the larger cities will be very soon operated by electricity. With the long distance hauls there are, of course, more problems to be met.

"Some of these problems are serious, and, so far as I am aware, no altogether satisfactory method of getting around them has been proposed. The question of the motor unit is one of these.

"If a steam locomotive breaks down, it affects that motor unit only. But if the motive power of an electric road is put out of commission everything on the road, or at least on a very considerable section of it, comes to a standstill. In other words, the electric road carries all its eggs in one basket.

"Such a condition of affairs is more or less precarious, of course. In these days of hot competition it affords an easy way for an unprincipled and malicious rival to put a road out of business.

"Naturally, I do not mean to say that any such desperate tactics would be resorted to by any railroad company or its employes, no matter how bitter was the rivalry. I merely mention the possibility by way of illustrating how open the electric road is to a clandestine form of attack that would, for the time being at least, paralyze its entire service.

"And then there is another thing. The third rail seems to be an essential feature of the electric road's equipment. At least, up to the present time there does not appear to be any entirely satisfactory substitute for the third rail system in anything like heavy electric railroading.

"Now, the stringing of these heavily charged rails over a wide section of country involves great possibilities of danger unless some better way of protecting them is devised than any now in use. And how are they to be protected if the shoe of the motor car is to come in constant contact with them, as it must if it is to pick up the power?"

"I do not, of course, say that these difficulties in the way of the long distance electric road are insurmountable. Far from it. I only mention them as now existing and as at present not yet overcome.

"There are many who believe that the substitution of electricity for steam in long distance railroading is an affair of the near future. They believe that the passenger trains will be first operated electrically, leaving the freights to run by steam on different tracks.

"This is all wholly within the possibilities of the not remote future, as is even moving of freight by electricity. The electric motors certainly have the speed and the power. There are still the difficulties in the way of applying the speed and power

that I have mentioned, as well, perhaps, as others equally serious.

"Yet the long distance electric roads are rapidly extending. The Lake Shore road is paralleled by an electric road from Cleveland, where I am now living, to Toledo. There is an electric line in operation from Toledo to Detroit.

"Between Buffalo and Cleveland, I believe, there is still a short gap to complete before there will be a continuous electric line between these two cities. When it is completed there will be a continuous electric road in operation from Buffalo through Erie, Cleveland and Toledo to Detroit.

"There is no electric line yet completed between Toledo and Chicago, but undoubtedly that connection will be made at no distant day.

"I understand they are running sleeping cars over an electric road from Columbus, O. to Pittsburg. I have never ridden in them, but those who have say they are very comfortable.

"Electric road fares are about one-half the amount charged by the steam roads, and the local business of the steam roads must be quite seriously encroached upon by them.

"As to the driving of a heavy, fast electric train, very much the same qualities and equipments are required that are required in the engineer of a steam locomotive. Brains are required in both cases; brains and quick, cool judgment, power of maintaining concentrated and alert attention during intervals of considerable length.

"Combined with this, of course, there must be the temperate, orderly life on the part of the motorman or engineer, without which those necessary qualifications cannot be counted upon. It is true that the man at the controller of an electric car need not be equipped as the good engineer is, to just about rebuild his engine as it

stands on the tracks, but he is required to have first class mechanical training and adaptability in other directions.

"When people trust their lives in a railroad train, whether the motive power be steam or electricity, they are entitled to have a man in control of the power that whisks them at such great speed through the country who is a first class man in every respect—in brains, in vigor and in responsibility of character. The weeding out process before men who begin as firemen get to be engineers is probably more severe than most people imagine. I suppose it would surprise you to learn that less than 17 per cent. of the firemen on locomotives ever get to be engineers, yet such is the fact. And the standard for engineers is all the time growing higher."

Do Electrical Devices Cause Fire?

The popular idea that electricity causes many fires is about as correct as the once prevailing notion that all steam boilers explode and illuminating gas always asphyxiates.

The argument can be carried along other lines, and might, in the eyes of some, on account of what would be regarded as an ever present danger, prohibit the use of electricity and steam and gas for industrial and domestic purposes. There is one advantage that cannot be overlooked, which has arisen, due to the widespread application of electricity, and that is the demand on the part of the board of fire underwriters that certain specific requirements be fully met with, or the use of electricity for light, heat and power cancels the insurance and exposes the proprietor to an imminent risk.

Do electrical devices cause fire? This is a question which in a sense has met with a full answer from the manufacturers of these devices and the installers. It is comprehensive in that it includes not only apparatus, but wire, moulding and all forms

of insulating material. It is a well-known fact that the safety valves of an electrical system are its fuses, and it is mainly at these points that danger from fire can be anticipated. But if these fuses are covered with incombustible material so that when they blow no flash or flame can possibly appear, where, then, does the danger lie? It has been claimed that switches will arc, and fires originate at these points. But the unbiased observation of many witnesses has been to the contrary. Switches undergo the severest of tests before they can be used as a reliable electrical device. In this respect manufacturers more than toe the mark. What, then, is left? Some say the wooden moulding catches fire, but this is disproved. The report of the committee on arts and sciences, published in the Journal of the Franklin Institute on Fennell's apparatus for fireproofing wood, covers this subject thoroughly. The use of moulding does represent a possible source of conflagration, but when we hear of the requirements of an ideal fireproofing substance, as cited by him and applied in practice by his methods, to make wood "fire resistant," even this risk disappears.

An ideal fireproofing substance to which reliable moulding is subjected must accomplish the following:

Render wood "fire-resistant" in the highest degree.

Have no deleterious effect on the wood, but, on the contrary, serve as a preservative.

Have no injurious effect on the strength of the wood.

Have no hygroscopic qualities.

Produce no efflorescence.

Preserve the natural color of the wood.

Have no injurious effect on varnish or paint applied to its surface.

Be nonvolatile under the action of heat.

Exert no corrosive or rusting action on metallic substances.

This leaves little to be desired and disposes of the vital points in the question asked. A building entirely dependent upon electricity for its light, heat and power is by far the best insurance risk the community can offer. It is the safest building to reside in, and it represents the epitome of hygienic and engineering accomplishments.—Electricity.

New Field for Electricity.

A large electrically driven steel rolling mill is in operation in upper Silesia. The plant includes three groups of three-foot high mills, each having an independent direct coupled motor and fly wheel. An alternating current of 5,800 volts is received by an induction motor of 600-horse power and transformed to a direct current of 510 volts by a motor generator with a capacity ranging from 500 kilowatts normal to 1,000 kilowatts maximum output, the number of revolutions varying from 25 to 300 a minute. The variations in the demand of the work are equalized by a twenty-ton cast-steel fly wheel. In the three rolling mills are included a blooming train of a single stand of eighteen-inch rolls, making sixty to 100 revolutions, a medium train with two stands of fourteen-inch rolls and 150 to 200 revolutions speed; and a small section mill with seven stands of ten and a half-inch rolls, with from 300 to 400 revolutions a minute. The motors of the blooming or roughing and the medium trains are each of 200 average and 600 maximum horse power. The first has a twelve-ton and the second an eight-ton fly wheel. The small section mill has a motor ranging between 300 and 400-horse power with a five-ton fly wheel. The roughing mill takes steel blooms 8 1/4 inches square, which can be finished to bars 200 feet long, but, as a rule, the blooms are only reduced to 2 1/2 inches square and then sheared into lengths for finishing in the smaller mills, which roll bars up to 130 feet in the medium and 225 in the small section train.—Chicago Tribune.

Girl's Ordeal in the Alps

THE heroic records of ancient Greece contain no tale of bravery or endurance more worthy of remembrance than the act of a modern Grecian maiden—Mlle. Hadjilazaro. M. Hadjilazaro, a member of the Genevian section of the Alpine club, set out with his two sisters from Zinal for the mountains. Relying upon his expertness as a climber and great knowledge of that part of the range, he did not take a guide.

For five or six hours all went well with the intrepid three. Roped together, they successfully scaled the Grand Cornier. The last difficult piece of climbing did not deter them. They felt sure of themselves. The girls were innocent of thought of danger, so completely did they rely upon their brother, who was first on the rope.

They looked forward to the descent of the Glacier De Molry. It is not regarded as difficult, but all glaciers have one spice of danger—a concealed crevasse. At the height of 13,000 feet, or less, they had some hours of mountaineering before them before they were down again at Zinal.

M. Hadjilazaro, anxious for his sisters' safety and feeling the heavy responsibility upon him, took extra care, but he lacked that instinct which guides have. He could not be quite sure.

Suddenly he called a halt and bade the girls look out. He feared a concealed crevasse. He bent forward to test the foothold. Scarcely was he on his hands and knees before the treacherous snow gave way beneath him. His sister next on the rope had but a few seconds to think and act. Her nerve never left her. Swinging, partly pulled by his fall, over the crevasse, she braced herself with one leg on each side and bore her brother's weight upon her hips.

What could be done?

M. Hadjilazaro called that he could not climb up. He did not even try, lest his sister's strength should give out as he tugged at her in the effort.

Rapidly the sisters made up their minds. The one at the end of the rope untied herself and went off to Zinal alone for help.

Would she get there safely? The brother in danger, the sister supporting him upon her hips as she stood astride the crevasse in an altitude only a woman could have kept for long, did not know.

As the minutes one by one made way for the other and lengthened into hours the noble girl felt as if the strain would send her mad. The rope cut into her hips and the pain was excruciating.

Her brother tried to ease her by cutting steps in the side of the crevasse and holding on to them, but he dare not attempt to climb. A slip would mean death for both in the depths. As he looked and called encouraging words to her the icy cold water fell drop by drop upon his forehead, in imitation of the greatest torture known to the Spanish Inquisition. To add to the horror darkness came down on the mountain.

For twelve awful hours they held out. Then, when they felt that human nature could withstand the awful strain no longer, a welcome cry rang out. Lights shone over the glacier. Their sister had brought help. So as not to alarm the rest of the family she had descended by the Col de l'Allee and arrived at the village in two hours and a half, at 8:30 in the evening.

Frantically she sought guides. But things are slow at Zinal. It was hours before she could collect the five men she needed, with lanterns and Alpine life-saving apparatus.

Not till 7 in the morning—and she started for succor at 6 the night before—did the rescue party reach the courageous girl and release her from her trying ordeal.

