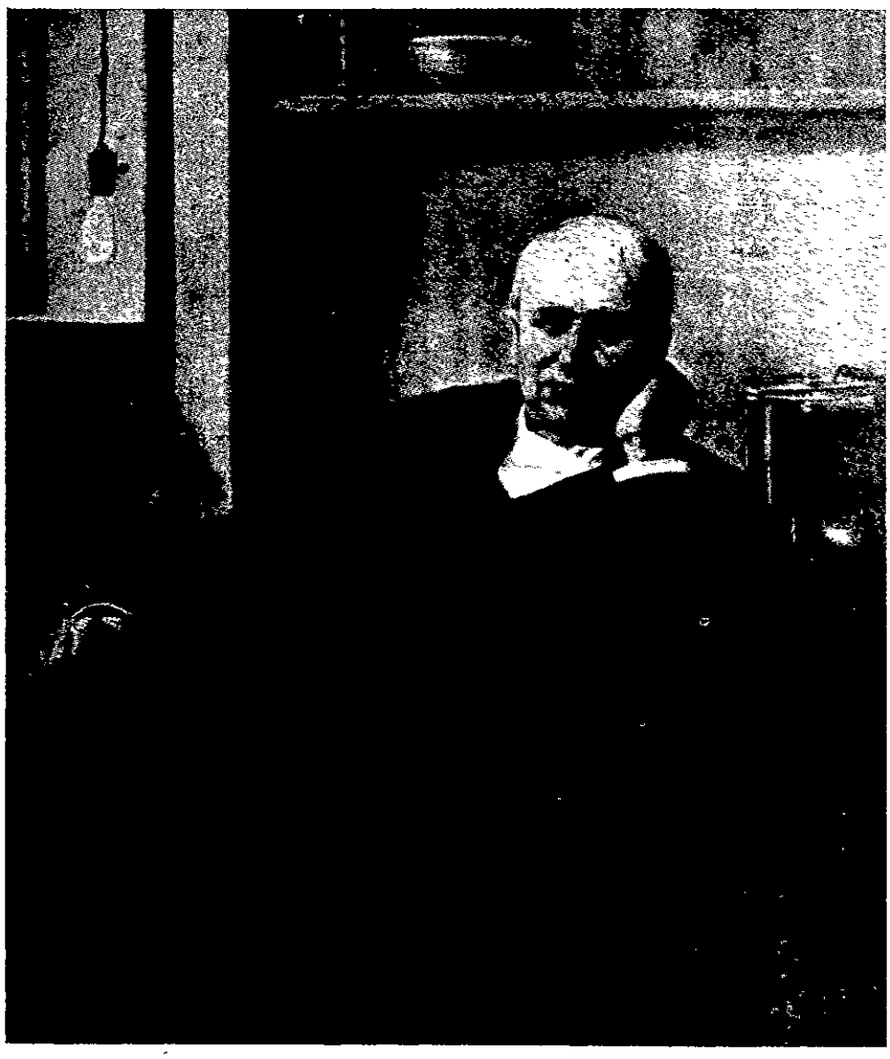
Engineering

The Edison Storage Battery.

Last month early it was announced that this long promised storage battery was about to be practically demonstrated in London. The fact was cabled and noted in PROGRESS. Mail advices just to hand state that the new battery is for use on street car systems. The inventor is satisfied that a car will run a whole day without recharging. He has expressed the opinion that the use of the new battery would revolutionise surface car traffic. He predicts that street car lines will employ none but cars equipped with the new batteries when he has demonstrated their commercial value; the tracks will be without either overhead or underground wires, or rails for the transmission of current, and comparatively cheap stations only will be necessary where the storage batteries may be charged after they have exhausted their store of current. There is no news of the promised demonstration. If the inventor is right—and when has he been wrong?—a great revolution in tram traffic is at hand. Tram owners hard pressed to keep pace with the times should watch this closely.



LATEST PORTRAIT OF C. A. EDISON,
Whose Storage Battery is just coming into use on Tram Tracks.

Blackwell's Island Bridge.

Another Edition of Quebec.

When the Quebec bridge fell into the water, drowning so many workmen, the ability of the American engineers was quickly challenged. Professional men on the British side of the water said that they sacrificed solidity to cheapness, taking too many risks. Comparisons of various designs for bridge construction were published in the technical papers of Great Britain and America. Several representative Americans replied with ridicule of what they chose to consider the hidebound British prejudice in favour of weighty costliness. But before the end the whole weight of expert opinion on both sides of the Atlantic was against them, and the end, which was the final report of the Commission of Enquiry into the Quebec disaster, left their prestige greatly shattered.

During these discussions one particular American railway train and traffic bridge was much in evidence. This was the bridge at Blackwell's Island, over the East River, New York. In comparison with the Quebec design, this appeared to be of a strength far greater. Men repeatedly said, "If the Quebec specifications had been like those of Blackwell's Island things would have been different."

But a thoroughly alarmed profession was looking into things, and once out of the Fool's Paradise, where the spread-eaglers had lived so long, they quickly pounced on the Blackwell's Island bridge, then approaching completion. The bridge had cost between five and six millions sterling; it was the greatest cantilever structure in the world, it had the prestige of America written large all over its immense and imposing decks, traffic ways, railroad tracks, and the rest. A remorseless profession examined, checked, learned, inwardly digested, and without hesitation condemned the bridge as dangerous, insisting upon an investigation to determine the actual strength of the structure. The Bridge Department of the United States consented, and the investigation was entrusted to three men—Professor Burr, of Colombia University, and Messrs. Boller and Hodge, bridge engineers of New York—all of them possessing the confidence of the engineering profession.

While they investigated, the fears of the experts of America grew to white heat. When they reported the revelation was a catastrophe. The report meant that if the bridge, when opened, was subjected to the loads for which it was designed it must collapse, as the actual strains would in every case exceed the strains for which the bridge was designed, in one case going as high as 47 per cent. over the point of safety.

In the beginning, when the bridge was designed, the determination was to have it made strong enough to carry the greatest possible congested load that could be put upon it. This was found to be 16,000 pounds of moving weight for every lineal foot of the structure. Subsequently the Department determined to add to the capacity of the structure, by adding four elevated tracks. This involved a very large increase to the live loads, and ought to have meant also the thickening and strengthening of the general design proportionately.

Prudence, says an expert authority, would have suggested that at this point, a complete recalculation of the bridge be made, and a new strain sheet drawn up. Instead of this, the first strain sheet was accepted as correct and *pro rata* increases were made in the sections of the various numbers.

Into the new condition of the bridge the investigators went very carefully, until they were able to make, after actual weight and measurement, a strain sheet of the whole. The result is written in the pronouncement above quoted, and it has been held by good authority to spell "the most momentous case of faulty design in the whole history of the designing of long span bridges."

Of course, this was bad enough. But there was worse to come. It was found that when the maximum stress was first calculated no allowance was made for secondary stresses or for snow load. The latter omission seems amazing, in view of the fact