In America.

During the past five years, experiments in accumulator traction were made on a commercial scale in New York, under the auspices of the Julien Company, which for a considerable time operated 10 or 12 cars on the 4th avenue road. Trials more or less successful were also made in Philadelphia, New Orleans, and the other American cities, above mentioned. The most successful storage battery road in operation in the United States is that of the Chicago Electric Traction Company, which runs a line about 20 miles long between Chicago and Englewood. There are no stations on the line along the route, the entire line being within the city limits, although the most of it is through only sparsely-settled territory. The cars are required to stop at all street crossings to let off and take on passengers. The batteries weigh 3½ tons per car, each battery consisting of 72 cells, and having a capacity of 400 ampere hours, while the weight of car, equipped with batteries ready for use, is 16 tons. The weight of rail is 80 lbs. Eight regular cars run on week days, but on Sundays and holidays as many as 40 are used, including trailers. Owing to the weight of the cars, they cannot be started and stopped as quickly as a trolley car, which only weighs 8 or 9 tons; but this inability results in more care on the part of the motormen, who always pass vehicles with the power shut off, giving them a better opportunity to use the brakes. The "accident account" is surprisingly low, only two-thirds of one per cent. of the gross receipts, while the usual rate for a suburban trolley line is 2 per cent. Motormen are trained to "coast" as much as possible, the weight of the cars enabling them to coast faster and further than would be otherwise the case. Snow storms have been successfully handled with but one plough, weighing 22 tons, and one sweeper, weighing 26 tons, for 26 miles of track. The manager, E. R. Gilbert, who was formerly connected with trolley lines, reports that he got more work out of these appliances than he had ever seen accomplished with machines operated by trolley. In one case they cut through a drift 7 feet high, and several hundred feet long, by "bucking" the drifts with a plough. Cars have been run 40 miles on one charge, but the conditions for such a long run are so often unfavorable that it has been found advisable to change the batteries every half trip of 11 miles, the power-plant being located in the middle of the system. By doing this, cars are able to carry trailers and make the trip under all conditions. Passengers do not seem to mind in the least the slight delay caused by changing the batteries, which takes only 1¼ minutes. The road-bed is nearly level, except one hill about 300 feet long with a grade of 9½ per cent. With a dry rail the cars easily climb the hill without assistance. In one instance, two loaded trailers were hauled, a counter-weight system being provided to prevent accidents and slipping.

"Our cars average over 200 miles per day," Mr. Gilbert says, "at an average speed of 12 miles per hour. Passengers, one and all, agree that riding on them is much more pleasant than on any other system, as the cars ride very smoothly, owing to their weight, without the unpleasant noise of the trolley or the jerking of the cable system. The advertising resulting from these conditions is worth considering." An element of importance is the fact that the whole line cannot be shut down at once, as all cars are independent of each other. There is no necessity for a wrecking wagon, as a wrecking car can always be sent out, as on a steam road. The steam plant (power-house) is also more independent than on a trolley road, as it can be shut down two or three hours without interfering with the service in the least. Current for lights in the office, barn and power-house is taken direct from the batteries, therefore there is no necessity to run the plant all night. It is closed down at 11 p.m., although the last car does not reach the barn until nearly 1.30 a.m. The load on the engines and dynamos is always constant.

Wear and tear on trucks, wheels, roadbed, and special work is very much heavier than on a trolley system, because of the great weight of the cars. We use an 80-lb. girder rail and all crossings, etc., are made extra heavy, but even then the cost of maintenance is very great. The depreciation of the batteries is 2c. per car mile, as against the depreciation of overhead work and rail bonding on a trolley road, which would amount for similar mileage to about $4,325 per year. Operating expenses average 8 2-3c. per car mile, comparing favorably even now with those on trolley systems, but the difference will be greatly in favor of the battery line, as the service on the latter grows towards the capacity for which the plant was built. "I see no reason," Mr. Gilbert adds, "why a storage battery system under fair conditions cannot be operated fully as cheaply as a trolley line." Taking a basis of 20 cars, and the mileage of the Englewood road, the difference in cost of construction of that particular road would be only about $25,000 in favor of the trolley system. To offset this slightly greater expense is the unquestionable advantage of having no overhead work of any kind to mar the appearance of the streets through which the road runs, or to add the element of danger to the public from live wires or electrolysis.

The numerous facts and data cited by Mr. Ziffer, as to the installation and operation of various systems in different parts of Europe, show that the accumulator, or storage battery, stands well the test of comparison. The following table is very interesting and instructive in this connection. It is given by Mr. Gofferneaux in his work on "Mechanical Traction for Tramways," and is a theoretical comparison of the cost of the different systems, including 10 per cent. fund for depreciation on the capital invested, and based upon an annual traffic of 621,382 car miles. The figures are in cents per car mile.

System of Traction.	Operation.	Depreciation.	Total.
	c.	c.	c.
Serpollet (steam)	9.7	3.5	13.2
Rowan (steam)	11.3	3.5	14.8
Electric accumulators	10.9	4.2	15.1
Trolleys	10.0	5.5	15.5
Gas motor	13.9	3.5	17.4
Compressed air	13.55	4.85	18.4

It will thus be seen that in point of economy, electric accumulators are superior to the popular trolley, while compressed air is at the foot of the list.

Reduction in the weight of batteries would materially lessen the cost of construction in a storage battery railway, as lighter cars, rails, and equipment generally could be employed. In competition with the trolley, the construction of which costs per single mile, according to Mr. Pearson, of New York, $16,650,