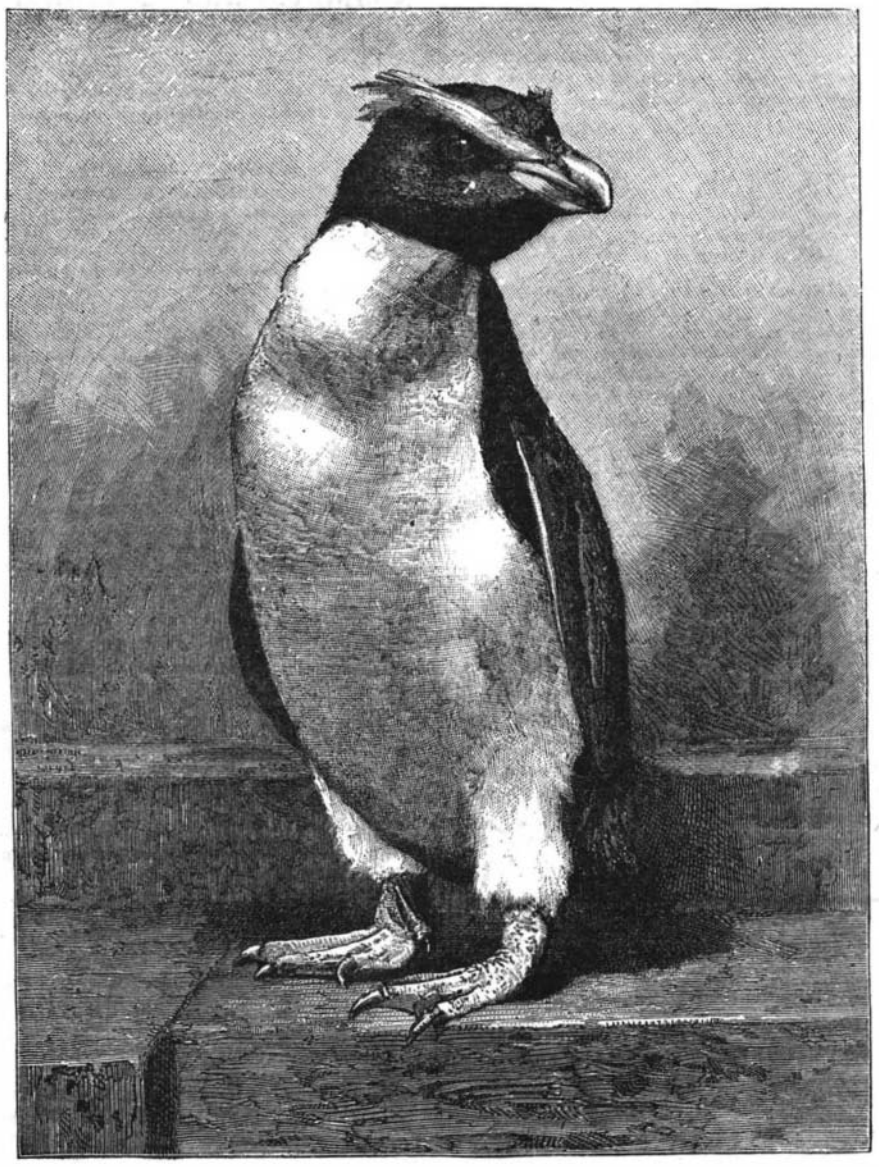
THE ROCK HOPPER PENGUIN.

Among the additions made lately to the collection of birds in the Zoological Society's Gardens, Regent's Park, the specimens of the rock hopper penguin, from New Zealand, are certainly worthy of attention. The one forming the subject of our illustration is an exceptionally handsome representative of that, in many ways, remarkable group of aquatic and flightless birds known as penguins, constituting the family *Spheniscidæ* of ornithologists. In these birds the wings are totally unfitted for flight in the air, but, being small and covered with short rigid feathers, they are, by being used as paddles, admirably adapted for swimming beneath the surface of the water. As their legs, which are not so long as those of an ordinary sized duck, are situated far back on the body, the birds stand perfectly upright upon them—a formation that renders their movements on land somewhat awkward and ungainly. In the water, however, when engaged in hunting their finny prey, they are extraordinarily active. The name "rock hopper" was given to this genus of the family by the sailors, who noticed the peculiar way they had of jumping, with curious little hops, from one rocky projection to another. They are also known as "macarones" and as "yellow crested penguins," for from the base of the upper mandible on each side a broad line of golden yellow passes over the eyes, and is continued for two inches beyond the head in a crest of fine pointed feathers. Although these birds are plentiful in their chief *habitat*, the Falkland Islands, yet, strange to say, they are rarely seen in confinement. The specimens the Zoological Society have lately acquired are lodged in the fish house in a large cage, which is well supplied with water and artificial rock work, so that the peculiar actions of the birds in both elements can be observed. At feeding time a large glass-fronted water tank also enables visitors to watch and admire their rapid flight through the water in pursuit of the fish with which it has been previously stocked. The crowds that daily assemble here at the hour when this performance takes place testify to the fact that it is one of the sights of the Zoo. Our illustration is from a photograph taken by Major J. Fortune Nott, F.Z.S.—*The Graphic.*



THE ROCK HOPPER PENGUIN.

RUNNING ELEVATED RAILROAD TRAINS BY ELECTRICITY.

Quite an interesting electrical experiment took place on the rainy night of November 27, on the Ninth Avenue elevated railroad in this city, being a trial of a new Daft-electric motor, named the Benjamin Franklin, weighing about ten tons. Its four wheels are connected for the purpose of increasing the tractive power. Notwithstanding the driving rain, it hauled a train of three regular elevated railroad cars very easily up heavy grades for a mile and a half. At the end of the route, the motor switched off, backed, and hitched on to the other end of the train, with the same facility as with the steam locomotive; in fact, it seemed to be done with greater ease. The total weight of the train was estimated at sixty tons. The current was supplied from dynamos located in a station in Fifteenth Street. The electrical current is conveyed from the station and alongside of the track by a copper rod ⅝ of an inch in diameter. The current is taken from this rod into the motor by a metallic brush which presses upon and slides along the rod. The trial was undoubtedly a severe one, inasmuch as the rails and connecting rod were saturated with water. A number of prominent railroad engineers, officials, and electricians were present, and were perfectly satisfied as to the result of the trial. It appears to be only a question of time when our city elevated trains will be hauled as rapidly by electricity as with steam.

The *Electrical Review* says: In the power station, four dynamos, of 50 horse power each, supply the current, and a fifth, of smaller size, serves to light the place. The power dynamos are connected with a switchboard, which permits of their being used "in parallel" or "in series," as may be desired, without trouble or delay.

These terms merit a word of explanation, as the first of them describes a disposition which is an important factor in the economical generation of dynamo electricity. When two machines are connected—both positive poles to one leading wire, and both negative to another—they are said to be "in parallel," and the current obtained is greater than the sum of the currents of both working separately, in direct ratio to the reduction of their internal resistance brought about by the coupling.

This arrangement may be carried further, but with a rapidly lessening degree of advantage. Coupling machines "in series" consists in passing the current of the first through the second, and so on.

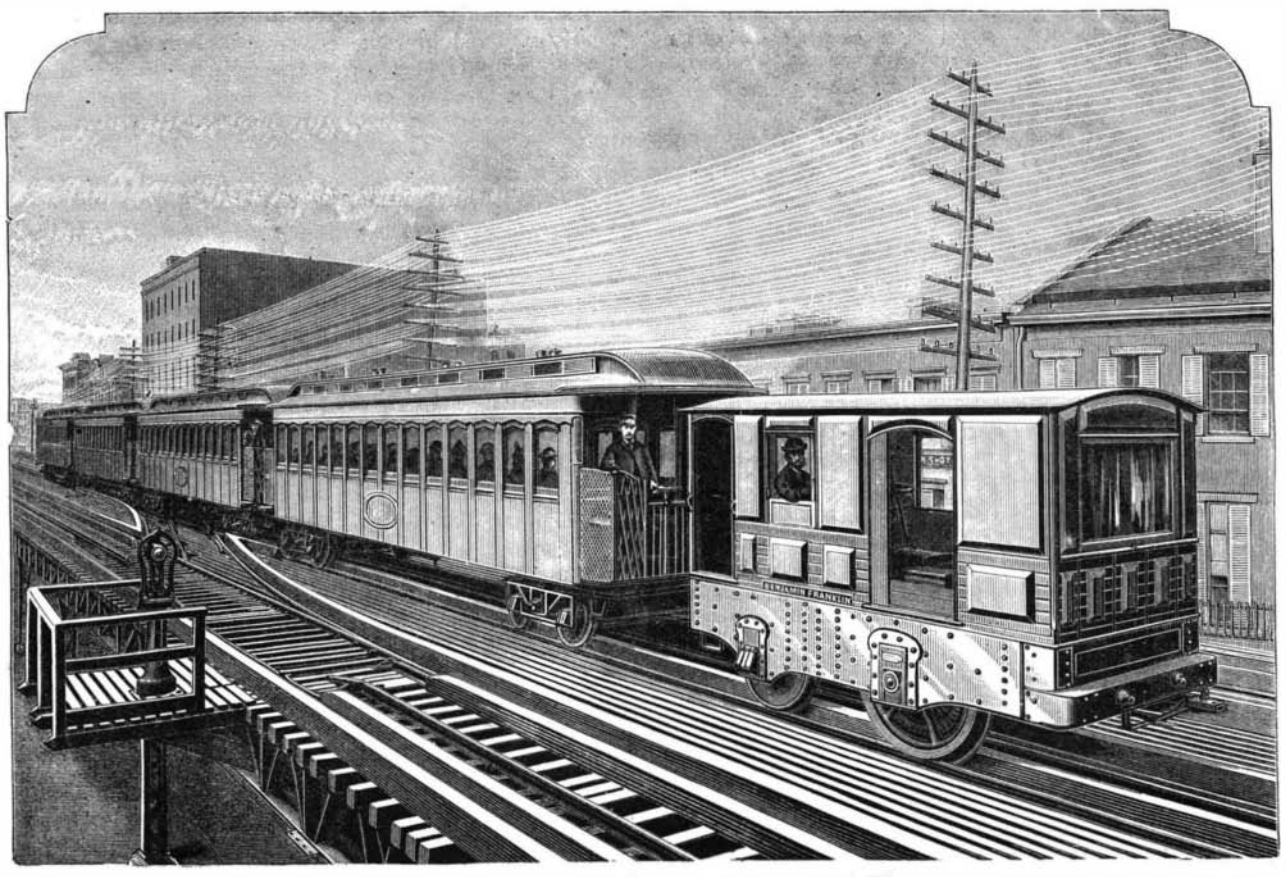
An important instrument is the automatic cut-off, which is brought into play by the occurrence of a "short circuit" on the track, and opens the *ketee*, or chain, as our German friends term it, at a fixed point, sounding at the same time an alarm. This contingency, which might befall through accident or mischief, would have the effect of unduly lessening the resistance, and so increasing the quantity of current that it might develop enough heat in the insufficient circuit to destroy the insulation of the field magnets and armature coils, and disable the machines.

The steam engine that drives the generators is of 250 horse power, and the potential of the current developed 280 volts, a step beyond that used at Baltimore, but still within the danger limit.

The illustration of this article shows the Franklin with a four-car train. In her experimental runs she has repeatedly drawn this train with less than three-fourths the current-generating capacity in use, up and down the line at a speed of 25 miles per hour.

With the same current and three unloaded cars, a speed of 30 miles per hour was kept up uninterruptedly for a long time.

The commercial outcome of the achievements of the Franklin could hardly be forecast; but, in consideration of the well substantiated claim that the substitution of such motors on the New York elevated railways would reduce the running expenses about 50 per cent, and this even when including, as a fixed charge, the interest on the cost of re-equipment, and also without allowing any rebate for the sale of the present steam locomotives, which are of standard gauge and available on any ordinary track, there should be little doubt as to the probable line of action of such a sagacious and far-sighted management as that of the New York elevated railways.



THE DAFT ELECTRIC MOTOR ON THE NINTH AVE. ELEVATED RAILWAY NEW YORK.

Electrical Storage Street Cars.

The Julien Electric Company is running three cars on Fourth and Madison Avenues, this city. Until recently, the batteries were changed after each round trip of 12 miles. Now they are changed after the second round trip, or 24 miles. Even then, the battery requires but about three hours' charge before it is put on the car again. The company hopes very soon to make three round trips, or thirty-six miles, with one charge. If it can accomplish this, there will be required but one charge of battery a day, thus making a great saving of time and labor. In other words, horses will be changed but once a day. All this is due to the scientific progress the Julien company is making, more especially in the storage battery. The company has done a great deal of experimental work on the three cars now in use, and has put them to such practical tests as to be able to settle on a standard. Hereafter, the standard car of the Julien Electric Traction Company will be an 18 foot body, mounted on an independent rigid truck, with a 6 foot wheel base and, on Fourth Avenue line, a 15 horse power motor, geared to each axle. The car will carry 144 cells in six groups of 24 each. This novel grouping is for economy; for by this means, the motors will be run most of the time in series, instead of all together in parallel, as at the present time. Not one of the Julien cars has yet broken down or become disabled since they were put in service.