ELECTRO-PHYSIOLOGY.

At Owens College, Manchester, Professor Stirling lately delivered a lecture on the electrical properties of the tissues, but especially of those composing the nervous system. There are about fifty species of fishes which are known to have specially modified organs for the generation and discharge of electricity. These organs when at rest do not discharge their electricity; but if the animal be irritated, electrical shocks are discharged, which in some fishes are very powerful indeed. By means of electrical discharges these animals not only stun their prey, but they ward off the attacks of their enemies. The animal may discharge its batteries voluntarily, but after having done so for a considerable number of times the electrical organs become fatigued, just as muscles after severe exercise are fatigued. At first sight it might seem remarkable that certain animals are provided with structures which evolve powerful discharges of electricity. This, however, is not by any means the most remarkable fact. When we know that the whole of the body of the animal is traversed by the electrical current at the moment it is discharged, it does seem far more wonderful that the tissues of the animal itself are not thereby affected; not even a muscle is caused to contract, although the discharge must necessarily traverse the nervous system as well as the muscles. The animals, therefore, have an immunity from the effects of their own shocks. Darwin admitted that the presence of these organs in a limited number of fishes was a fact not easily explained on the evolution hypothesis. Recent researches, however, have shown that the electrical organs are really modified muscular organs, or the terminations of nervous structures in muscles. This fact greatly simplifies the problem. Muscles and nerve, however, evolve electricity in the living condition; and a variation of the electrical conditions of a muscle, a nerve, or even of protoplasm, generally is one of the best signs of the vital activity of these structures. With Galvani's experiments on the twitchings of the limbs of frogs, there commenced the investigation of electrical phenomena, which have led to such splendid results, not only in physiology, but to the development of new means of producing electricity and its numerous applications in the arts. The lecturer demonstrated the classical experiments of Galvani, Volta, Noboli, Du Bois Reymond, and others, showing historically on what lines our present knowledge of animal electricity had been reached.

THE TELEPHONE AND LIGHTNING.

Whilst research and statistics on one side, says the journal *Assecuranz*, have demonstrated that the number of thunderstorms, accompanied by severe strokes of lightning, have increased during the last 10 years, it has, on the other side, been proved that in larger towns both the number and effects of the same have considerably decreased. To the latter fact, no doubt, several of the inventions and discoveries of recent years contribute, among which the telephone nets now spread over the roofs of houses in towns are, we consider, one of the principal causes.

A large telephone installation, consisting of numerous wires of steel, suspended in the air over the houses like a huge steel net, each wire of which is connected either at the stations or in other places with the earth, where they again touch a network of gas and water pipes of iron, forms, with the latter, a kind of electrical safety wire fence above the city. For a city so enveloped is but a reality of Faraday's famous physical theory that a body completely encased in metal cannot become electrified through an electric current outside the metal case.

However, telephone installations do not act as lightning conductors alone by the wires at each end being connected with the earth, but also by most of the poles supporting the wires being of metal, and connected with the lightning conductors, if any, or by acting as such themselves.

The amount of protection which a telephone net affords to the buildings below it depends, in the first instance, on the local distribution of the wires, an area being the better protected by such a steel wire net the heavier and the more uniformly the metal is distributed over the same. Therefore that part of a city situated near a telephone station is the best protected as the metal net is there thickest.

As regards the metal supporters on the roofs, those nearest stations afford the best protection, and next, those bearing the most wires. Those supporters, whence wires of any length emanate, should advantageously be connected with the lightning conductor, if any, or otherwise by points and earth conductors be converted into such, which will afford a still bette protection for the buildings in question.

That a telephone net affords the protection here claimed for it, statistics from late years go to prove beyond a doubt, as for instance, those relating to the town of Munich, where in spite of numerous severe thunderstorms, no severe casualty through lightning has occurred since the city became envel, oped in a telephone net. In suburbs and the country, however, where the factors described are absent, the cases have in no way diminished.

RESULTS OF GOOD PATENTS.

W. P. Proctor, vice-president of the Singer Sewing Machine Company, lives at the Fifth Avenue Hotel, and has the best horses and carriages in the city, but never rides. His own exercise is walking, and the carriages are for his family. He was a mechanic when he first met Singer. They went into partnership to make rock drills on Cherry Street. The drills worked with a hand ratchet. Their factory blew up, and Singer walked all the way to Boston in the hope of interesting Boston people to start a factory there. While in Boston he was asked to go around the corner to see a wonder—it was a sewing machine. He came back to New York, and said he could make a better sewing machine than the one he saw. They raked together $50, and the machine was made, and in thirty-five years this $50 of capital grew to be $30,000,000. Proctor married Singer's daughter, and is probably worth $25,000,000. He owns a third of the stock of the Singer company. It is amusing to hear him tell at times how, in the early days of his sewing machine experience, he and Singer used to dream of the time when they could make 2,000 machines a year, which they were certain would yield them a fortune. To-day they make 2,000 a day.—*Daily Paper.*