DEATH OF PROF. ELISHA GRAY.

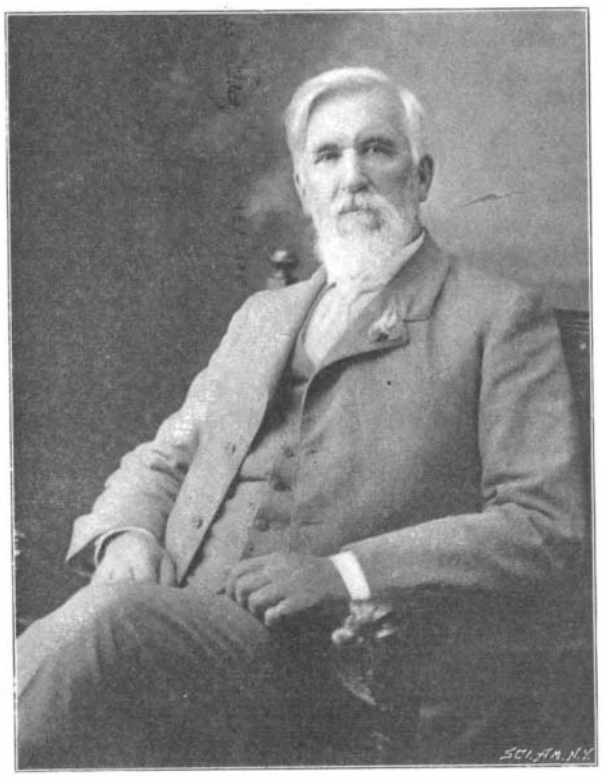
Elsewhere in this issue we illustrate and describe the last invention in which one of the electrical pioneers was engaged. The career of Prof. Elisha Gray, D.Sc., was a most pathetic one. He was a man of marvelous talent and ingenuity, and in the opinion of many who have calmly weighed all the evidence, it is likely that he will receive justice at the hands of future historians by being immortalized as the inventor of the speaking telephone. The litigation in the early history of the telephone, which was of the most complex nature, finally resulted in the decision that Prof. Bell was the inventor of the telephone, and as such was entitled to the credit and profits which would naturally accrue from such an important invention, but many persons hold that the victory was a technical and corporate one, rather than one based on science.

Prof. Gray was born at Barnesville, O., in 1835, and commenced his career as a blacksmith, and also served an apprenticeship to a carpenter and boatbuilder. At Oberlin College he constructed the apparatus used in the classroom for experiments, and acquired the knowledge of that time in regard to electricity and its applications. He spent five years at college; and six years later obtained his first patent, this was the percursor of some fifty others. His first patent was granted on an automatic self-adjusting telegraphic relay. In the early seventies he devoted great attention to the phenomena of sounds transmitted over telegraph wires—electro-harmonic telegraphy. In pursuing his investigations he made a discovery to which the invention of the telephone was largely due. He relates it in his own words:

"My nephew was playing with a small induction coil, taking shocks, for the amusement of the younger children. He had connected one end of the secondary coil to the zinc lining of the bathtub, which was dry. Holding the other end of the coil in his left hand, he touched the lining of the tub with the right. In making contact, his hand would glide along the side for a short distance. At these times I noticed that a sound was proceeding from under his hand at the point of contact, having the same pitch and quality as the vibrating electrome."

On February 14, 1876, Prof. Gray filed a caveat in the Patent Office at Washington with the expectation of perfecting the "art of transmitting vocal sounds telegraphically." Prof. Alexander Graham Bell and Prof. Dolbear were workers in the same line, and it is said that Prof. Bell's patent was applied for a few hours earlier than Gray's, therefore the former received the patent. In the litigation which ensued, Gray alleged that his caveat had been on file before Bell's application, and he contended that there had been collusion with an official of the Patent Office. The courts decided, however, that this was not the case, and ruled against the Chicago inventor. Prof. Gray parted with his rights to a company whose name was The Harmonic Telegraph Company, by which transaction the Western Union was retired from the field.

Another of Prof. Gray's inventions was the telautograph, which was so far an improvement on the telephone and telegraph as it transmitted the actual writing of the message. He also invented various telegraph and telephone instruments and appliances, and the last work on which he was engaged was the perfection of a system of under-water fog signals, which is fully described in the present issue. As an inventor he sought to avoid multiplicity of mechanical devices. Intricacy to his mind was a failure. He sought to make electricity do its work directly, and all his devices were to this end.



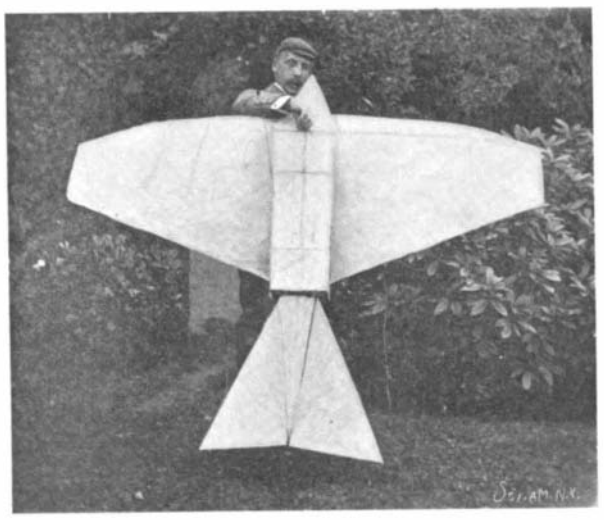
THE LATE PROF. ELISHA GRAY.

A NEW FLYING MACHINE.

An ingenious flying machine has recently been designed by a Scotchman, Mr. G. L. O. Davidson, of Inchmarlo, Scotland.

Mr. Davidson has based his machine upon the principle of the flight of the bird. In flying, a bird does not propel itself through the air, but glides forward by opposing the resistance of its wing surface to the air. It will be recollected that both Lilienthal and Pilcher adopted this theory in their respective machines, and were eminently successful in gliding downward through the air from an eminence, and although they ultimately met their deaths during the course of their experiments, their untimely ends were not due to faulty theories, but through mishaps to their apparatus. In flying, a bird flaps its wings up and down, which has the effect of raising it in a vertical direction, and then between the beats it glides forward, and the constant repetition of this action produces forward flight. In the smaller quick-flying birds these movements are scarcely discernible, owing to the rapidity with which the wings are flapped, but with the heavier and larger birds, such as the albatross and gull, the movements are perfectly distinguishable.

The result of these investigations convinced Mr. Davidson that the successful flying machine must be heavier than the air, and that it must not be raised by means of the balloon, but by a mechanical agency in which the vertical raising power should be greater than the downward pull of gravity. To propel a machine upward against gravity, only a small fraction of the operator's power is available to overcome the attraction of gravity, and the weight of the apparatus to generate sufficient power for this purpose is always more than it can lift. In his machine the lifting power is greater than gravity, so that the apparatus can easily lift itself, the combination of the two forces supplying the necessary forward motion to the machine.



PLAN VIEW OF FLYING MACHINE.

In design, the Davidson machine resembles a huge bird with its wings fully extended. The body of the bird constitutes the car, in which are placed the steam turbines for generating the necessary power to actuate the lifting appliances, placed at the extremities of each wing. These "lifters," as they are called, resemble rosettes of flanges, placed horizontally, and in revolving obtain a purchase on the air in the same manner as the propellers of a steamship beat the water. Directly these lifters are actuated to a velocity which yields an upward vertical thrust greater than the downward gravity pull, the appliance rises, and as the body of the machine is inclined at a slight angle it is constantly sliding forward through the air, rising in a diagonal direction until the desired altitude has been attained. If the speed of the lifters is decreased, so that the downward gravity attraction exceeds the upward vertical pull, the vessel then glides at a downward angle, the angle being controlled by the movements of the lifters, but at the same time the automatic equilibrium gear can be set to maintain any desired angle. If the lifters, while traveling at the maximum speed, are suddenly arrested, the machine does not stop, but continues its flight, gliding gradually to the ground meanwhile. The velocity of the lifters depends, of course, upon the dimensions of the machine, since the length of the blades is proportionate to the size of the vessel. In a machine weighing ten tons, which would be the smallest practicable vessel, the blades would each measure twenty feet in length.

Another ingenious or striking characteristic of the vessel is the method by which its equlibrium is maintained. To the rear of the car is attached a huge tail, similar to that of a bird arranged in three movable sections. This mechanism is automatic in its action, but can be governed at will. Should the car list to either side, the tail immediately assumes the necessary position to restore it to its normal vertical poise. By this means, it is impossible for the machine to capsize. To substantiate this important feature, in the course of his experiments with the model (illustrations of which are shown) the inventor released it upside down from a great height. Before the craft had fallen many feet, it had reverted to its correct position, and then glided slowly to the ground. The equilibrium of the vessel therefore cannot be deranged, even if the wind is blowing upon it broadside. The machine is steered from the fore part, which acts as a beak, the gear being controlled by hand.

Mr. Davidson proposes to come to the United States to construct a full sized experimental machine weighing ten tons, with which to demonstrate its capabilities. Such a vessel will be 60 feet in length, by 120 feet in width, and will provide accommodation for fifty passengers. It may be supposed that such an immense craft will prove weighty and unwieldy, but such will not be the case, since although the framework will be built of soft steel, the specific gravity of the vessel will be no more in proportion to its outspread surface than that of a bird. The vessel will be equipped with engines capable of exerting a lifting force of three feet per second.

MR. DAVIDSON'S FLYING MACHINE.

MR. DAVIDSON'S FLYING MACHINE IN FULL FLIGHT.

Some experiments in wireless telephony have been carried out at Minneapolis, Minn., and messages were successfully transmitted a distance of a thousand feet across the Mississippi. The conditions were not favorable, owing to the nearness of two electric railways. The weather conditions were also bad, but words spoken were distinctly understood.