An Aerial Torpedo.

BY W. G. ASTON.

One of the most remarkable demonstrations of the possibilities of "wireless" has been made in London last month, when Mr. Thomas Raymond Phillips, a Liverpool engineer, conducted a series of experiments on a small scale with a dirigible balloon entirely manipulated and controlled from the earth. These tests were made at the Hippodrome, one of London's largest theaters. Mr. Phillips employed a dirigible on the lines of the "Zeppelin," but only 20 feet long. The model complete weighed about ten pounds and the aerostat was filled with hydrogen.

During the demonstration the inventor stood on the stage of the theater while his machine maneuvered about over the auditorium. He had by his side a keyboard something like that of a typewriter but rather larger, and in reality composed of a number of push switches; above this was a small transmitter similar to that used in ordinary wireless telegraphy. By merely pressing the keys Mr. Phillips showed that he could make his dirigible do anything he liked. He would press a switch over and the machine would promptly rise; the actuation of another key would produce a descent. Forward and backward motion was also obtained with perfect certainty, as well as circular flights and point-to-point voyages, which involved very intricate steering. The experiments lasted some hours, but never once did the model fail to do what the inventor had announced it was about to do. The most effective demonstration, however, was that in which the uses of such a machine in warfare were shown. The car of the dirigible had a trapdoor floor under the control of the operator, who after maneuvering the machine over a certain spot, opened a switch which caused the trapdoor to open and allowed a number of paper bombs to fall down.

The mechanism of the invention is extremely simple, and one that could be made perfectly reliable. In the car of the balloon are a number of coherers suited to different electric wave lengths, and these control small switches which put into and throw out of action two sets of propellers, the trapdoor, and the system of lamps whereby the airship can be lit up when desired. The accumulators for working the propellers and lighting the lamps are carried in the car. The directional control of the airship is effected in a horizontal plane by a pair of propellers hung out from each side of the car on outriggers similar to those of the "Zeppelin." Either or both of these can be driven, and they can also be reversed either singly or together, so that the machine can be steered to the right and to the left, kept in a straight course, or reversed back in its own tracks without turning round.

Two horizontal propellers considerably smaller than the driving screws are also attached by outriggers to the "nacelle," and provide the means for control in a vertical plane. The machine is so balanced as to be approximately equal in weight to the air it displaces; consequently, when the horizontal propellers are not working, it neither rises nor falls, but can be made to ascend or descend by putting them in motion. Thus by using one vertical propeller and the horizontal ones the machine can be caused to move in a spiral path, and by cutting out the vertical screws it can be made to rise straight up.

The switches whereby the machine is controlled alter the wave length of the electricity produced at the transmitter, all the coherer switches on the airship being tuned to different wave lengths.

The demonstrations have been so successful that the British War Office have investigated the matter, and it is understood that they have taken the invention up. At any rate, trials with a full-sized machine are shortly to be made, and if these are successful the invention will be bought by the government. The dimensions of the full-sized war machine will be 60 feet long and 6 feet in diameter, and it will be capable of carrying nearly a couple of hundredweight of explosives while its radius of action will be well over 100 miles. Its speed will be about thirty miles per hour.

MR. EDWIN GOULD OFFERS \$15,000 TO THE SUCCESSFUL DESIGNER AND DEMONSTRATOR OF A SAFE HEAVIER-THAN-AIR FLYING MACHINE EQUIPPED WITH MORE THAN ONE MOTOR AND MORE THAN ONE PROPELLER.

The fac-simile letter of Mr. Edwin Gould, printed on this page, in which \$15,000 is offered for the best successful, heavier-than-air flying machine, driven by more than one motor and one propeller, speaks for itself. It may be pointed out, however, that Mr. Gould, in offering his prize, has been moved by other considerations than those involved in a sporting contest. Races, long-distance flights, speed tests, and other record-breaking performances, have no doubt done much to bring the flying machine prominently before the public; but it must be admitted that, besides whetting the natural human appetite for competition and driving home the truth that the flying machine is destined to play an important part in future human affairs, such contests aid the art but little.

It is Mr. Gould's primary intention to further aeronautic invention, and with that end in view he offers a prize, not for the fastest flying machine, but for a

Recent Study of the Sun.

The sun can be studied with comparative ease even by the possessors of small telescopes, consequently the announced discoveries are numerous; but astronomers are constantly placing their chief reliance on the statistical results of precise measurements and daily and long-continued observations, and they do not accept the physical theories advanced until after a long period of probation. Even data which have been admitted and used for many years are not exempt from criticism. Thus, the elements of the sun's rotation determined by Carrington fifty years ago, which are still used in the reduction of the photographs taken daily at the English observatories, have been called into question. Turner has examined the measurements made by Peters. between 1860 and 1887, which fill the gap between Carrington's work and the Greenwich photographs. He reaches the surprising conclusion that the sun spots of the northern and southern hemispheres revolve about two different axes, which make with each other an angle of 6 minutes. The spots appear to be affected by a general drift which changed direction about 1885.

The hypothesis of a planetary influence on sun spots has been often discussed and generally rejected. In its favor, however, may be cited the proved fact that the last maximum in the number of spots which was announced for 1905, was delayed nearly two years, and that this retardation had been predicted by Brown as a consequence of the motions of Jupiter and Saturn.

The solar activity gradually decreased in 1909, as had been expected. Nevertheless, a group of spots remained visible from November, 1908, to April, 1909. The group which appeared in September, 1908, was found to be connected with a violent magnetic storm. Lockyer's photographs made with the spectroheliograph, show that the principal spot was gradually obliterated by clouds of calcium which exhibited a cyclonic structure thirty hours before the maximum of magnetic disturbance. Mitchie Smith observed that an extraordinary outburst of activity in the same spot, was quickly followed by violent and prolonged agitation of the magnetic needle. This group of spots affected the earth's magnetism in four successive revolutions, in two of which it produced two disturbances at intervals of five days. This fact suggests the influence of two limited and divergent beams, analogous to the double tails of certain comets.

The tendency to recurrence at intervals of 27 or 28 days, is well established for magnetic storms and auroræ. The question has been asked whether other terrestrial phenomena do not similarly show the influence of the sun's rotation. From the records of cyclones in the Indian Ocean, Maunder finds that an interval of 28 days is of common occurrence.

The first results of the total eclipse of 1908 have been published.

The report of MacClean's expedition say that the corona exhibited the character, usual at intermediate epochs, of great extent in the middle latitudes, but that it was distinguished by certain features from all previously observed coronas. The coronal rays or streamers showed no connection with the protuberances.

The United States during February produced pig iron at a rate which equaled 31,650,000 gross tons per annum. During January the rate was about 31,000,000 tons, and in December about 31,450,000 tons. In commenting on these figures, the Iron Age considers it is questionable whether the February rate will be maintained during March, since the daily capacity of coke and anthracite furnaces in use at the beginning of the month was 84,854 tons, whereas the daily rate of production for February was 85,616 tons. "It is hard to realize," the journal remarks, "that in February the production was more than 40 per cent above that of February of last year, and nearly 2 1/3 times that of February two years ago, and yet that so little metal is pressing on the market. . . . It is not surprising that a question is raised of the ability of the country to absorb pig iron at the present rate throughout the year."

St. Louis Southwestern Railway Company.
Office of the President.
Edwin Gould, President.
165 Broadway.
New York June 2, 1910.

To the Editor,
The Scientific American,
New York City.

Dear Sir:-

In order to promote progress in aviation, I offer through the Scientific American, a prize of \$15,000, which is to be given to the inventor who designs and demonstrates in this country the best heavier-than-air flying machine equipped with more than one propeller, and with more than one independent motor, in such manner, that the motors can be operated together or independently.

My object in offering the prize is to encourage the invention of a heavier-than-air flying machine which will be able to continue in safety on its course, even though one of the driving devices should break down.

In order that the efficiency of the inventions may be thoroughly tested, it will be necessary to subject them to endurance tests of stipulated length of time or distance.

Full conditions governing the award of the prize will be announced in a later issue of the Scientific American.

Very truly yours,

Edwin Gould

MR. EDWIN GOULD'S OFFER OF A \$15,000 AVIATION PRIZE.

type of flying machine which has thus far not been constructed. Absolute safety must certainly be attained before a flying machine can ever become even a popular vehicle of pleasure, and the attainment of safety is the chief object which Mr. Gould has in view.

The conditions which will govern the novel contest which will be inaugurated by Mr. Gould's magnificent offer have not been decided upon as yet. They will require deliberation. It is hardly likely that we shall be able to publish them for three or four weeks. In the meanwhile, the Editor will gladly consider any suggestions which the readers of this journal may make, so that conditions may be drawn which will be fair and which will best serve the object of the prize.

Kinetic energy is the power stored in a moving object which keeps it in motion. By way of illustration, conceive a railway train rushing along a straight, level stretch of track, the train being driven to its power limit. If the source of power, say the steam pressure, is now suddenly removed by closing the throttle, the train will continue to run or "coast," for a long distance, due to its kinetic energy, gradually reducing in speed until the energy is exhausted and the train stops.