THE ALVARES AEROPLANE FLYING MACHINE.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

A new flying machine has been constructed upon the aeroplane principle. The apparatus is the invention of Senhor Alvares, of Brazil, and has been constructed under his supervision by Messrs. C. G. Spencer & Sons.

In this apparatus the designer has adopted the bird with wings outspread in the act of flight as his model. As will be gathered from the accompanying illustration, the machine consists essentially of two huge aeroplanes similar in shape to the wings of a bird outstretched in a swooping position. The framework is constructed throughout of bamboo, even including the body, thereby obtaining the maximum of strength with the minimum of weight, the various members being held taut in position by wires. The front members or ribs of the two wings terminate centrally and the aeroplane material is tightly secured thereto, and being triangular in shape, the two wings terminate in a point at the rear. The two wings measure 40 feet from tip to tip and the aeroplanes have a total superficial area of 400 square feet. In the forepart of the machine are placed two out-riggers. Each carries at its forward end a two-bladed propeller or tractor 5 feet in diameter, and having a speed of 240 revolutions per minute. These are driven by belting from a 2-horse-power single-cylinder vertical gasoline air-cooled motor with a speed varying up to 1,600 or more revolutions per minute. The motor is placed centrally in the machine, about level with the operator's head, though for purposes of easy control it is within convenient reach.

In the place of the tail are two horizontal rudders, controlled by guide ropes, and these perform the same function as the tail of a bird. By the manipulation of these rudders an upward or downward course is maintained while there is an additional fish-tail rudder for directing the machine to the right or left. The gas bag is entirely dispensed with, the lifting power of the apparatus being entirely dependent upon the aeroplanes combined with the power exerted by the tractors.

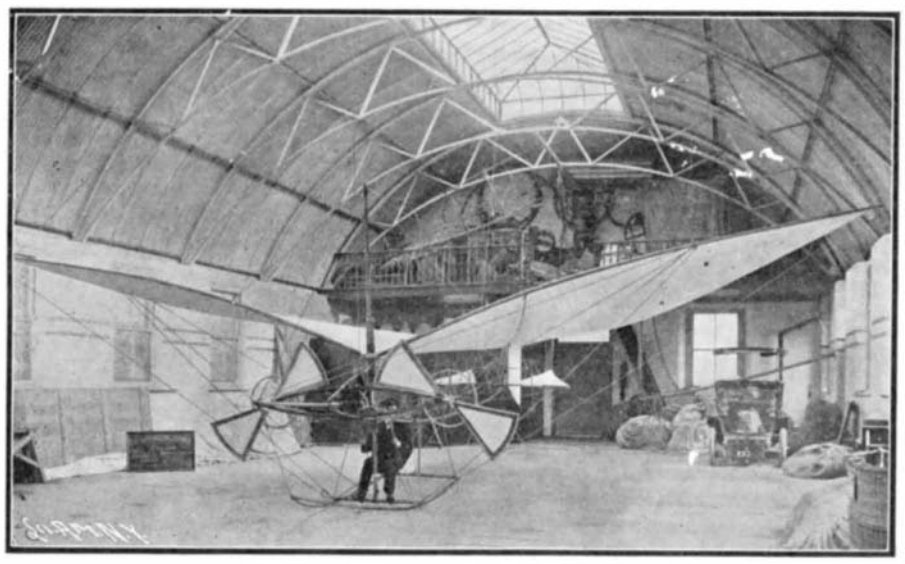
The aeronaut has a seat slung from the body of the apparatus in the fore part, and as near the estimated center of gravity as possible. Perfect control is assured by converging every controlling mechanism within the operator's reach. The aeroplane has a total lifting capacity of 150 pounds. The general design of the machine is symmetrical. The front ribs of the wings have graceful curves and they, as well as the body, taper gently away to the rear.

The machine cannot acquire sufficient impetus to enable it to lift itself from the ground. In order to test its flying capabilities, however, it was intended to attach the apparatus to a balloon and to carry it to an altitude of 5,000 feet. The gasoline motor was then to be set in motion, and, while running at full speed, the aeroplane was to be cast off. Instead of carrying a passenger, ballast equivalent to 150 pounds in weight was to be attached, placed in the position the aeronaut would occupy while standing upright. By these experiments valuable data respecting the center of gravity, balance, and general behavior of the machine would, it was hoped, be obtained.

The machine is not supposed to drop vertically or to glide in the same manner as the flying machines of Lilienthal and Pilcher, but to descend gradually in a series of aerial jumps, as it were. Gravity is the power-giving motion, the motor simply exercising an accelerating or retarding influence so that the curves will be of a great radius.

For the purposes of practically demonstrating the possibilities of this principle of aeroplane construction, an open tract of country was employed. The balloon used in connection with the trial was of 25,000 cubic feet capacity. The aeroplane was attached to the balloon and when an altitude of 3,000 feet was attained the motor was set in motion and the airship was cast adrift, its progress being followed both from the occupants in the car of the balloon, and a group of interested experts on the ground below.

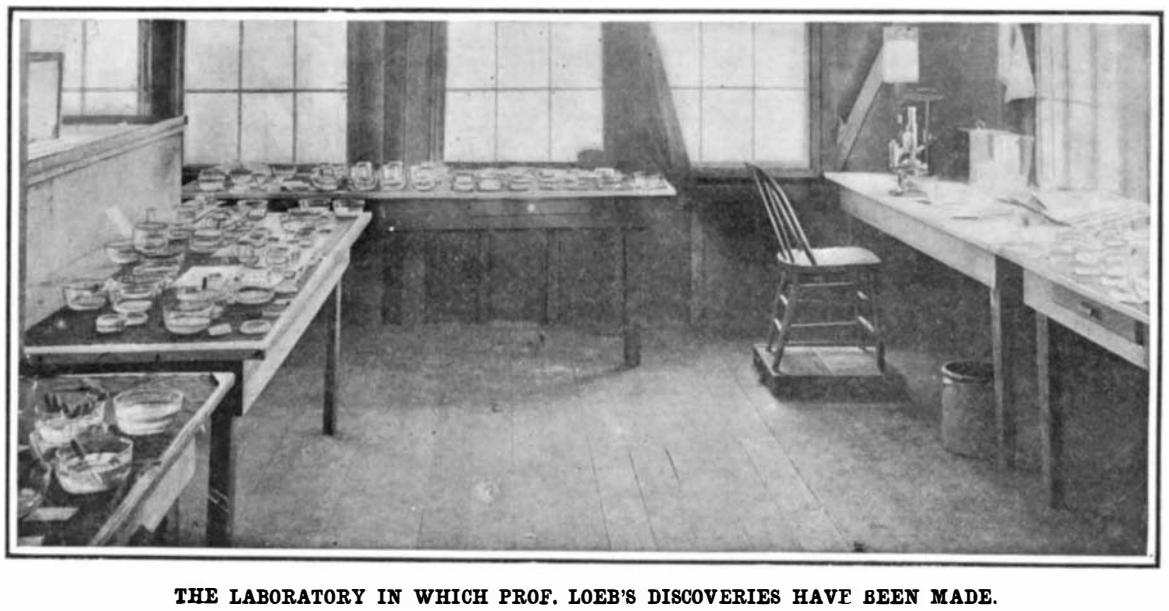
When the aeroplane was liberated it plunged rather erratically toward the earth for some distance. When it had regained its equilibrium, however, it sailed steadily in a horizontal direction. The propellers revolved rapidly and the aeroplane maintained its balance in a perfect manner. It traveled at a high speed for over a mile, and then came slowly and steadily to the ground as the power of the motor became exhausted. The experiment was attended with complete success, and testified to the efficiency of the design. A larger machine with a motor having sufficient power to lift the machine from the ground will soon be built.



THE ALVARES AEROPLANE FLYING MACHINE.

Composition for Cleaning Fabrics.—The mixture is formed of oil of turpentine, 264.80 grammes; ammonia, 190.20 grammes; methylic alcohol, 250.30 grammes; ether, 22.56 grammes; acetic acid, 22.50 grammes; water, 250.20 grammes.—Science Pratique.

PROF. JACQUES LOEB.



THE LABORATORY IN WHICH PROF. LOEB'S DISCOVERIES HAVE BEEN MADE.

THE CREATION OF LIFE BY ARTIFICIAL MEANS.

BY ENOS BROWN.

To create life and control its form at will is, confessedly, the ultimate objective of a school of physiologists of which Prof. Jacques Loeb, M. D., of the University of California, is conceded to be its most advanced, profound, and confident apostle. Startling as this announcement of the aspirations of the modern scientist may appear to the average thinker, it is based not upon metaphysical or academical speculations, but upon infinitely minute and long-continued experimentation and convincing demonstration. Evidence, which cannot be doubted, has been accumulated, evidence that shows how life can be created by purely chemical means.

Dr. Loeb was from 1892 to 1902 professor of physiology at the University of Chicago. Before coming to the United States he studied at the German universities of Berlin, Munich, and Strasburg. In 1902 he was called to the chair of physiology in the University of California and is now with that institution.

The conclusions of Dr. Loeb, after patient and continued investigations, are incorporated in his latest work, entitled "Studies in General Physiology," a decennial publication of the University of Chicago, 1905. It is a work of an epoch and only to be appreciated by the most advanced students. In these studies the author unequivocally asserts that it is possible to control life phenomena and that such control and nothing less is the true aim of the science of biology. In taking up the problem of regeneration the idea of controlling these phenomena was the starting point, the first aim being to find means by which one organ could, at will, be caused to grow in place of another organ. As far as the problem of fertilization is concerned, the first step toward its solution consists in an attempt to produce larvæ artificially from unfertilized eggs in various classes of animals.

After painstakingly exact and long-continued experimentation Prof. Loeb has succeeded in fertilizing and subsequently in developing eggs of the sea-urchin by employing artificial means alone. In the earlier experiments of Dr. Loeb artificial solutions were used instead of sea water. It has been found that the results were the same when sea water was used.

The most rigid precautions were taken to prevent fertilization by active cells of the same species. To destroy all germs effectually the sea water used was raised to a temperature of 140 deg. All tools, dishes, appliances, and the animals themselves which furnished the eggs, were cleansed in running fresh water. All other precautions were taken against the possibility of developing eggs without fertilization.

The processes by which these amazing results were obtained are stated in the bulletins issued from time to time by the University of California, in which are described the methods of fertilization and subsequent development of the eggs of animals which were the subject of experimentation. One method of treatment consisted in placing the eggs for about two hours in hypertonic sea water, in which the proportion of salt was somewhat increased, and afterward placing them for a few moments in normal sea water to which a minute quantity of ethyl acetate had been added, the eggs then taken from this mixture and placed in normal sea water, when membranes formed. Almost without exception each egg developed into swimming larvæ. With such simple means as a weak solution of vinegar acid and a strong solution of common salt the experimenter may duplicate in the laboratory the results of one of the most typically vital processes.

Chemical substances in skillful hands can be made to produce effects upon eggs which imitate, in all essential respects, the results of normal fertilization. Large numbers of larvæ of sea urchins, normal and healthy, may now be produced from the egg by purely chemical and physical means.

In this the scientist is able to imitate natural fertilization completely, and the fact that a large proportion of larvæ, thus raised, seem to have the same vitality as when produced in regular order

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