

**Among the model self-propelled aeroplanes shown,** those of Prof. Langley should undoubtedly have first mention. The steam-driven machine flew about half a mile over the Potomac River at Quantico, Va., a little less than ten years ago, or on May 6, 1896. This was the first flight of a motor-driven aeroplane. The gasoline-propelled model (which has a five-cylinder air-cooled motor, the cylinders being arranged in a circle) made numerous shorter flights in August, 1903. Prof. Langley's models are constructed on the following plane principle. The original inventor of this device, which was first brought out about 1878, was Mr. Brown, and samples of Brown's "bi-planes," as they are termed, are shown on page 93. A lift of only about 20 pounds to the horse-power is possible with this system, as against a lift of from 100 to 150 pounds per horse-power with the superposed plane type. In actual practice Langley obtained about 18 pounds lift. Langley's complete steam machine weighed 30 pounds, while the motive plant developed 11.4 B. H. P. The gasoline model was one-quarter the size and one-sixteenth the weight of Langley's man-carrying machine. It weighed 58 pounds, of which 10 pounds was in the 10 horse-power engine. As to the actual flights of these machines, there can be no question, for the one on the date mentioned was witnessed by Prof. Bell, and photographs were taken of the machine in flight.

Another interesting model is that exhibited by Mr. Herring, and which he claims has made numerous successful flights. When tethered to a high pole with a long cord, this machine is said to have flown 15 miles in a circle in December, 1902, and to have stopped only when the gasoline supply gave out. A single-cylinder, air-cooled gasoline motor having mechanically-operated inlet and exhaust valves and a make-and-break igniter, all worked from a single cam, and carrying a small propeller on its crankshaft, was shown on this machine. The weight of the motor was said to be only 2 pounds, and its maximum horse-power 0.51 at 3,400 R. P. M. In flight, however, the engine only made about 850 R. P. M. and developed but 0.07 horse-power. The aeroplanes of this model (which is shown in the lower left-hand picture on the preceding page) were 5¼ feet long by 14 inches wide, and the 19-inch propeller which was fitted drew them through the air at a speed of about 30 miles an hour. This machine is of the usual rectangular, curved, superposed plane type invented by Chanute and Herring about the year 1896. Its successful operation is said to be due to an equilibrium-maintaining device which its inventor prefers to keep secret. **No photographs of this or of larger man-carrying machines in flight were shown, nor has any trustworthy account of their reported achievements ever been published. A single blurred photograph of a large birdlike machine propelled by compressed air, and which was constructed by Whitehead in 1901, was the only other photograph besides that of Langley's machines of a motor-driven aeroplane in successful flight.** In order at least partially to substantiate their claims, it would seem as if aeroplane inventors would show photographs of their machines in flight. This has been done by Mr. Maxim and Prof. Langley; and on account of his desire to secure photographs of his tetrahedral kites in mid-air, Prof. Bell uses red silk in their construction instead of nainsook, which he prefers, but which, owing to its light color, is difficult to photograph.

In contrast to the great secrecy of the later aeroplane experimenters, should be noted the free manner in which that first great experimenter in gliding flight, Otto Lilienthal, gave the results of his experiments to the world. One of the early gliding machines used by him in 1893 was exhibited, and a photograph of this