

which, even with the load that hangs to it, is lighter than the bed of air it rests on. The air-ship and the water-ship have gravitation on their side—that is to say, they rest on something heavier than themselves, and gravitation does not pull them down; they sink naturally into their bed. But the aeroplane has gravitation against it, and it must fight all the time for its life.

How does it do it? How does the great weight keep up there, heavier than the air it rests on?

There are many ways in which we could explain it, most of them difficult to understand unless we go into the laws of physics and into mathematics; but one of them is simple.

An aeroplane flies for much the same reason that a kite flies. The wind strikes under the inclined surface of a kite, and as long as the string keeps it from being blown backwards, the wind force holds the kite up. Even on a perfectly calm day a kite will fly if you "create" a wind by running with the kite string.

Screwing a Path through the Air

An aeroplane's wings are inclined like the surface of a kite. The engine and whirling propeller take the place of the kite string and the runner. The aeroplane "creates" its own wind. It is the power of the engine alone that keeps it going. The engine turns the propeller and the propeller draws the flying chariot behind it. Take a screw and let its point get a grip on a piece of wood, and it will draw its whole length into the wood with powerful force. Put a big

THE "FOLLY" AS IT FLEW



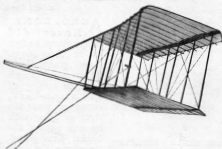
Although Professor Langley did not reach the point of building a flying machine that would carry a passenger, he did build a machine—a model of only $1\frac{1}{2}$ horse-power—which was the first heavier-than-air machine driven by its own power to make a successful flight. The Wrights, who made flying machines practical, used the information obtained by Professor Langley in his experiments. This model was known as "Langley's Folly."

screw on a ship and drive it into the water, and it will carry through the water the ship and all that is in it. Put a screw into an aeroplane and drive it into the air, and it will carry through the air whatever is fixed behind it.

The propeller is the screw. It screws its way through air, which is as real as wood and water.

The air resists the propeller of an aeroplane, but the propeller screws its way exactly like the screw of a ship or the screw in a piece of wood, and the aeroplane must follow where the propeller goes, and as it rushes through the air, the inclined planes are not only pushed upward by

THE GREAT-GRANDFATHER OF ALL FLYING MACHINES



This affair, simpler even than your box kite, may be said to be the great-grandfather of all flying machines. It is the kite first used by the Wright brothers in making experiments with heavier-than-air craft. Next came the glider without power—the grandfather. Then the introduction of the engine that supplied the power—the father of all types of flying machines.

the air beneath, but the wings are so shaped that their great forward speed creates a vacuum on their upper surface which holds them up by suction, so to speak. This upper vacuum is one of the most important features of flying.

Remember that air is matter, and the thought of an airship riding on it, or of an aeroplane screwing its way through it, will be easier for you to understand. The flying motor-car cannot stand still like the floating airship, but as long as its engines drive the propeller round, it will screw its way through, and the marvellous things that control its wings will send it up into the clouds or bring it slowly back to earth. The way is not always smooth. It is bumpy at places; there are hills and dales for the aeroplane to cross; and suddenly it may fall a hundred feet. But it will right itself with perfect ease; and the control of man over his new motor-car of the skies has become one of the greatest human triumphs of all time.

The Miracle we almost Forget

To-day, in places situated near aerodromes, the whir of an aeroplane winging through the sky scarcely wins a glance from the man in the street or the farmer at his plough. Flying machines speed from one country to another; they hop across oceans; they carry tourists, men in the rush of business, public officials hurrying to distant conferences, physicians on emergency calls. In fact, the aeroplane has taken