

increasing or decreasing the leverage exercised by the elevator. This secures fore and aft stability. The machine otherwise has the exact dimensions of the 'Bleriot XII.' Fourteen machines are being constructed in or near Los Angeles.

Planeless Flying Machines.

Notes on the Action of Gravity and the Force of Propulsion.

If the centre line of propulsion is directed at an angle of 30 degrees with the horizon (60 degrees to the vertical), taking gravity at 16 feet fall per second, a force of 32 feet per second will produce a resultant which is level, as shown by the diagram Fig. 1 on the well-known principle of the parallelogram of forces.

It follows, therefore, that if we increase the propelling force (A Fig. 2) the gravity force (B) of course being constant, we lower the angle of propulsion as shown by

Gyroscopic Action on Planeless Flying Machines.

(By Peter Ellis.)

If four-screw propellers are arranged with their axes at right angles (as per sketch plan), and revolving at a high rate of speed, the machine cannot easily capsize, either fore and aft, or crosswise, because of the gyroscopic action of the propellers. Of course, screw propellers set up in this manner will not work so as to propel the machine, but if the side propellers (AA Fig. 2) are shaped to drive the air tangentially instead of axially, the difficulty may be overcome. I am at present experimenting on these lines.

Notes on Weight.

(By Peter Ellis.)

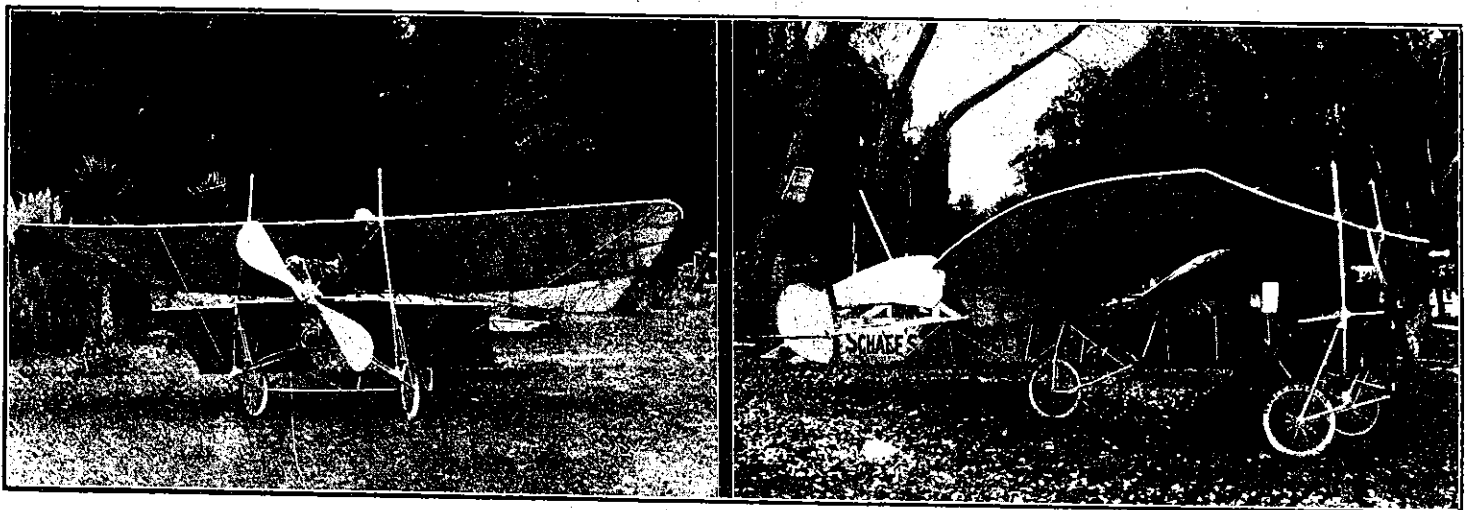
We say that a body weighs a ton, a hundredweight, or what not, according to

ties have weight when not balanced, i.e., when free to move toward that centre, but when such material rests on other material and cannot get nearer to the centre, its weight ceases. It may be said to press on the material it rests upon, but only in the same sense as its own particles press on one another. The Earth, considered as a whole, can have no real weight except in the direction of its orbit, unless it is drawn by some influence outside or inside or above or below that orbit. Weight being caused by the ability to move towards a certain spot without hindrance. If, for instance, the Earth could fall into the Sun it would have weight towards the Sun, or if it could fall towards any other spot it would have weight towards that spot.

Notes on Gravitation.

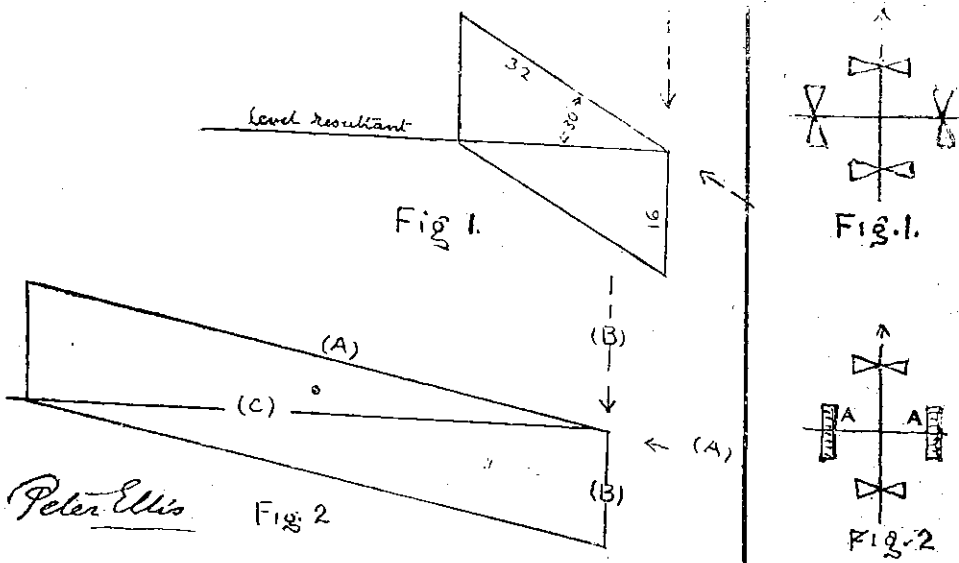
(By Peter Ellis.)

The earth being a mass of material existing in space (its shape being ap-



A NEW ZEALAND FLYER.

Designed by Mr. Schaef, of Wellington. The novelties of this Monoplane are the fore and aft elevating planes and the broad tiller of the steering rudder.



Figures to illustrate Mr. Ellis' Planeless Flying Machine and Gyroscopic Action.

the diagram, the resultant (C) as before being level.

To maintain a level line of flight, therefore, we must employ the propelling force at the proper angle according with the intensity of the force, otherwise the resultant will incline upward or downward as the case may be. This is where the airman's skill comes in, and only time and patience and experience will bring this about.

the nature and quantity of its substance, unless, however, the body is free to move or in the act of moving it has no real weight. This may seem a startling statement, but it is true, as I will explain. Taking the earth and all belonging to it, including its atmosphere, in the aggregate it is a mass everywhere attracted to its own centre; that is to say, all the particles composing the Earth are drawn toward a common centre within it, and such par-

proximately spherical, the form that all bodies naturally assume if possible) its particles must, of necessity, hold together in order to be a mass; gravitation then, is simply the holding together of the atoms. When a portion of this material is by any agency lifted away from the parent earth, it will return again to its bosom on the first opportunity; were it not so the earth must fall to pieces and cease to exist.

Berlin to Hamburg.

On March 28 two German officers, in training for reconnaissance purposes, flew from Berlin to Hamburg, covering the distance (143 miles) between 11 a.m. and 6.30 p.m., which works out at an average of about 20½ miles an hour. But the actual going, exclusive of stoppings, was 41.2 miles. Their machine was a new type of biplane which has been built to the designs of the military authorities at the Albatross works. The biplane carries a 50 h.p. Gnome motor and is provided with air-cooling apparatus. A special feature is that the seat for a passenger is placed at as high an elevation above that of the pilot as possible, so that the officer who acts as "passenger" can carry out reconnaissance while his companion controls the machine. The weather was favourable, light breeze and steady.