AERONAUTICS

Autogiro Possesses Stability Which Airplane Cannot Match

Rotor With Flapping Hinge at Some Distance From Center of Rotation Is Stable; Wing Not Inherently So

THE IMPORTANT research finding, that autogiros with their whirling rotor blades have more inherent longitudinal stability (ability to react against a pitching motion in flight) than do normal airplanes, was announced at the concluding meeting of the Philadelphia chapter of the Institute of Aeronautical Sciences by Prof. Alexander Klemin of New York University, in a scientific report with Lieut. Victor Haugen, U. S. Army Air Corps, and S. B. Sherwin, first holder of the newly created Cierva Memorial Fellowship at New York University.

The new report contradicts some previous wind tunnel experiments and is in accordance with practical experience. The theoretical investigations show that the rotor with its flapping hinge placed at some distance from the center of rotation is definitely stable, Prof. Klemin declared. In this the rotor is superior to the airplane wing which has no inherent stability of its own.

The investigations also show that as the rotor is placed above the center of gravity of the machine with its axis of rotation somewhat behind the center of gravity, the autogiro will be stable without the intervention of the horizontal tail surfaces. Such inherent stability without horizontal tail action is impossible in the airplane. Furthermore, rotors of the direct control type are pivoted about a suitable point so that not only is it possible to secure longitudinal control without use of an elevator but the rotor tends to change its inclination so as to increase stability. In the airplane, flying with free stick, the stability is less than flying with stick held in a fixed position. In the autogiro with pivoted rotor, on the other hand, there is a dual stabilizing effect. Thus from the point of view of horizontal static stability, the autogiro has distinct points of superiority over the airplane.

To remove the discrepancy existing between wind tunnel data and theoretical and practical reasoning, Lieut. Haugen will conduct an original investigation into the stability of the rotor with offset hinge, systematically varying the position of the hinge.

One of the most interesting problems in the helicopter today is whether superimposed air screws, as in the Breguet helicopter, or air screw placed on either side of the fusilage, as in the Focke helicopter, are more efficient. Mr. Sherwin has devised a special apparatus for investigating this point in the nine-foot wind tunnel of the Daniel Guggenheim School of Aeronautics of New York University.

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Brilliant Future Forecast

ROTARY winged aircraft of the autogiro or helicopter type will usher in the third stage of growth in man's conquest of the air, Igor I. Sikorsky, noted pilot and designer, told the meeting.

Mr. Sikorsky forecast a brilliant future for planes with rotary wings, particularly in the field of private flying, to add to lighter-than-air and heavier-than-air transportation, the two earlier stages of man's aerial transport.

By rotary wings, Mr. Sikorsky said, private flying can come into its own, for planes of this type overcome the main handicap of private flying today which is lack of ability to take off and land in small spaces. It is this handicap, he feels, rather than lack of speed, lack of safety or even high cost of operation which has limited private aviation.

For military use, Mr. Sikorsky foresees the day when rotary wing planes attached to the Navy will be used for rescue work at sea, the laying of mines, quick observation from small, isolated ships, and bombing.

Attached to an army, he suggested, rotary winged planes could effectively take over many of the communications tasks now performed by motorcycles, automobiles, and even horses. Observations and control of artillery fire and bombing attack would be possible.

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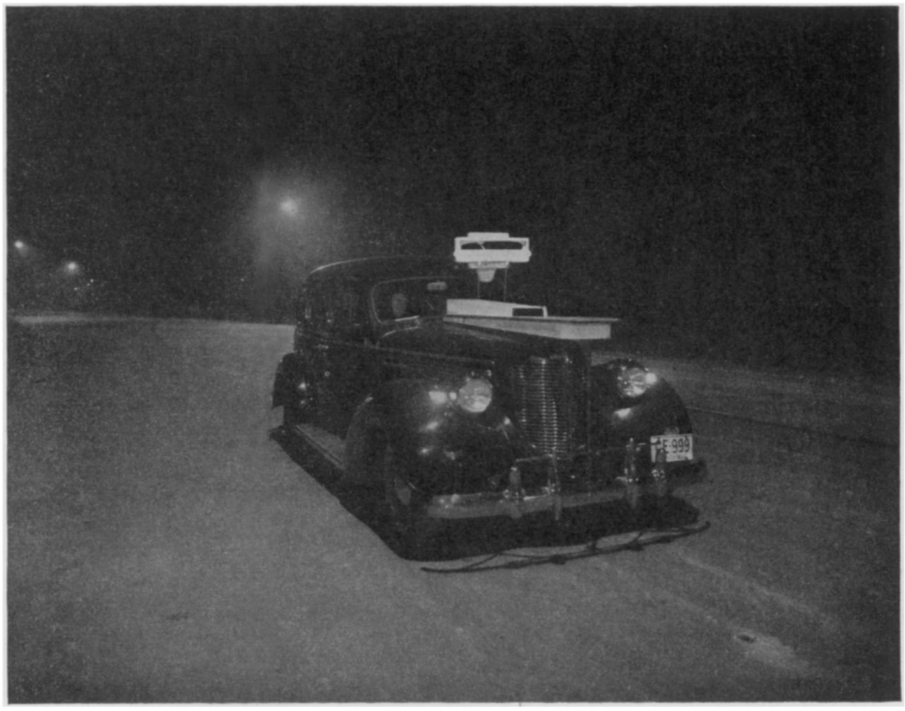

MEASURING BRIGHTNESS

A new instrument that measures how well streets and roads are lighted. Mounted on an automobile, it records the true brightness of pavement, brightness of objects along or on the road, interference to seeing caused by glare. Its use may make possible saving of some of the 5000 lives lost annually in traffic accidents merely because motorists could not see safely.