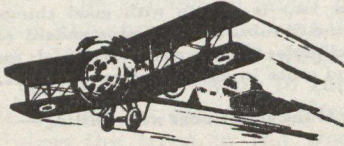


AERONAUTICAL SECTION



A department devoted particularly to the application of aerial methods in forest conservation and generally to the promotion of sane civil aviation in Canada.

Showing an Aviator How He Flies

Several devices are now being employed to test ability and technique of pilots.

AFTER nearly twenty years of flying without knowing just how he did it, man has now conceived a means of recording what an aeroplane pilot does and how the aeroplane responds. Aeroplane designers, builders, owners, instructors and pilots are delighted, though surprised, over the revelations of a method of recording accurately what an aviator does in executing any maneuver in an aeroplane, and also for securing exact data on the performance of an aeroplane in flight. This method has just been devised by the aeronautical experts and pilots of the National Advisory Committee for Aeronautics.

Three special instruments have been perfected to record the speed of the aeroplane in the air, the loadings or changes in weight on the wings, and the movement of the controls by the pilot.

Although fairly complicated themselves, the operation of these instruments is simple and mechanical, the recording being done by means of a photographic film. The results reveal for the first time a practical method of securing information in testing new types of aeroplanes, and for determining the ability and technique of a pilot. The last function of the instruments will be of great value to the pilots themselves and to instructors of novices, who are seldom able to recall just what they did with the controls at a certain point of a flight.

Three Instruments Record All Moves

The first instrument is an air speed meter, a device for recording the speed of the aeroplane through the air. A second is used for recording variations in the loading on the wings in flight, and the landing carriage when landing, taking off, or while running along the ground. In flying through a loop, for example, the pilot is sitting down hard as he goes up and again as he flattens out, but he is literally hanging in his belt at the top of the loop. It is these variations in load on the wings, due to the weight of the aeroplane and the aviator in the air that are recorded by this instrument and the weight on the carriage while on the ground. The third device, the control-position recorder, indicates the exact position of all the controls during any maneuver, or part of a flight. When the pilot gives his ship left rudder it is recorded in degrees, when he dives by pushing on his "stick," or pulls it back to lift the nose, these movements are shown on the record of the flight. After he lands, there is no

argument as to what he did, for it is plotted from an automatic record. If one pilot reported that a certain aeroplane was not controllable, he could be checked up by having another pilot put the aeroplane through the same maneuvers, and then comparing the records of both pilots as delineated by this new instrument.

Instruments Act in Unison

These three instruments are synchronized to operate simultaneously, by means of a timing device which makes possible the co-ordination of the three records into a composite one available for study and analysis. The instruments themselves are not bulky and they do not interfere with the movements of the pilot or operation of the aeroplane. All the attention they require is the throwing of a switch, before a maneuver is begun and when it is completed, to see them all in operation and to stop them.

When the flight is completed the photographic records with their delineations of the pilot's movements and the aeroplane's performance are taken to a laboratory, greatly enlarged for study, and then plotted on a single sheet so that a complete story of the particular flight or maneuver is ready for analysis.

The instruments developed have been employed at the Committee's free-flight laboratory at Hampton, Va., by Test Pilot Thomas Carroll, in studying ordinary and stunting maneuvers, including looping, rolling, the so-called Immelman turn and reverse turn. An extensive study of landing and taking off also has been made.

In his report on the tests, Pilot Carroll points out the importance of taking off and landing, which are the determining factors of the efficiency, and perhaps longevity, of a pilot. Of the two, he says, landing is perhaps the most important, for it is in this phase that the majority of accidents and damages occur. A paper on taking-off and landing by Major R. M. Hill, a British flying officer, is the only one known to have been published on these important maneuvers, and it was this treatise which inspired the tests and developments undertaken by the National Advisory Committee for Aeronautics in this country.

Keeping Tabs on the Pilot

Applications of this research work are seen in designing new aeroplanes based upon performance tests, testing ad-