Soaring ON INSTRUMENTS

THE FIRST OF A SERIES OF ARTICLES ON BLIND FLYING

by Robert Stanley

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(Author's Note: The following article was prompted by the information that some of my remarks at Elmira concerning the ease of thunderstorm soaring were construed to mean that a knowledge and mastery of instrument flight technique is inessential. Emphatically, such interpretation was not my intention! A higher degree of blind flying skill is required in cloud soaring than in any other form of instrument flight, and a paramount pre-requisite before one should enter an active cloud. In retrospect, it must be admitted, thunderstorm soaring is not easy; but it is rather intensely fascinating.

Cloud soaring and instrument flying, that pampered darling of scheduled air commerce, are of approximately equal age. In a brief decade, the use of instruments has virtually released air operations from their former dependance upon the whims of weather, has given us a network of airlines whose schedules are dispatched with clockwork regularity, whose impressive record of safety and reliability in face of nearly all varities of climate the four seasons can conjure remains one of the illustrious achievements of our century. Since the successful prosecution of cloud soaring predicates a knowledge of instrument flight technique, a discussion of some of the fundamentals of blind flying seems in order.

Some years ago, experiments were conducted to determine the flight instincts of birds. To simulate blind flying conditions, the birds were hooded so that they could not see. They were then released, and urged to escape. Instead, they chose to remain on the ground, despite prodding by their captors. They were then tossed from a high tower. Forced thus to fly, the birds invariably spread their wings in an attitude of great dihedral and glided to a very ungraceful landing from which they resolutely refused to budge. From these researches, it has been logically concluded that even birds cannot fly blind, that any claim to a flying instinct which does not depend upon visual reference, either to instruments or horizon, is but a suicidal delusion.

To adequately understand the impossibility of blind flight without instruments, a working knowledge concerning the mechanism by which our sense of balance is maintained, and a thorough recognition of its limitations, becomes imperative.

In the bony chambers of the inner ear are the semicircular canals whose curved passages are lined with a velvety carpet of cilia, tiny hairlike nerve filaments, sensitized to detect the flow of the fluid contained therein. Inclining the head, for instance, causes a relative flow of the fluid in the fore-and-aft canal, stimulating nerve endings which apprise us of the motion. Similarly, turning the head stimulates another set of nerve endings, cocking it to one side still another. Thus, for all three degrees of rotation, we have a sensitive mechanism within us which faithfully registers that rotation, endowing us with a sense of balance.

Our balance, however, is not infallible. The very principle by which this biological mechanism functions requires that all movement be of short duration, and be verified by visual or sensory reference to some fixed horizon. If you doubt this, have your barber whirl you in his chair with your eyes closed. If he starts smoothly, and accelerates rapidly, then maintains a constant rate of rotation, your sense of turn rapidly diminishes. In other words, the fluid in the inner ear quickly assumes the same speed of rotation as the rest of the body, and all sense of turn disappears. As the chair slows down, a false sense of opposite turn is felt.

If he now stops the chair suddenly, a powerful stimulus from the still rotating fluid gives a sense of turn opposing the original turn, although actually all rotation has ceased. If the eyes are now opened, it will be found impossible to focus them on any given object; they will try to follow the object which, though actually stationary, the senses tell you should be flashing past, so that the eye muscles will continue to flicker in vain pursuit of the madly rotating horizon for perhaps a half minute.

A favorite Link Trainer stunt is the "loop." A student cocks his head over on his shoulder, applies full rudder, rotates rapidly for several turns, straightens up, stops the turn, and enjoys the sensations of doing a loop, either normal or outside, depending on the direction of rotation, all the while actually seated stationary in a motionless trainer. Likewise the "snap roll" in which the head is placed on the knees, and a similar routine followed. These sensations, which tell us falsely of motions which do not occur, are termed "vertigo," and are ever-present foes to blind flying.

A further factor to impede the ease of blind flight is centrifugal force. On terra firma, a blind man is at home because gravity always acts downward. The weight of his body gives him a constant and infallible plane of