

**APRIL 1994**

*Proving inversion illusion (Royal Air Force Institute of Aviation Medicine, Farnborough, Hants., UK):* "Pilots' sensations of orientation while pushing over (bunting) are inconsistent. We flew 13 aircrew or naive subjects individually in a Hawk or Hunter jet training aircraft. With sun visor down and eyes closed, each was asked to report what the aircraft was doing. After unaccelerated level flight for 30 s, the aircraft was accelerated in level flight from 200 to 250 kts at +0.15 to +0.25 G<sub>x</sub>, and gently pulled into a stable 250-kt, 3000 ft/min climb. After 30 s, it was pushed to -1 G during 3 s. Minus 1 G was then held for a further 3 s. Of 30 maneuvers, 14 produced sensations of inversion in 9 of 13 subjects... This illusion was experienced by 3/3 naive non-pilots, 6/8 pilots, and 0/2 test pilots. We conclude that the 'inversion illusion' exists, and that the postulated sensation of backward rotation is often not perceived."<sup>1</sup>

**APRIL 1969**

*Foreshadowing Crew Resource Management (American Airlines, Inc., and Institute of Behavioral Research, Texas Christian University, Fort Worth, TX):* "The traditional division of work between the airline pilot, the first officer and the flight engineer originated in the piston engine era. It is still in use today, an anachronism in today's vastly different flight systems, and a growing threat to safety. Its rigid structure imposes duties and schedules which no longer fit the timing or the events of a modern flight operation. Consequently, technical advances which could decrease crew work load actually increase it. Today, a flight system with intrinsically less demands than formerly, is caused to place requirements on the flight crew which exceed their capacity to respond appropriately – and to do so routinely.

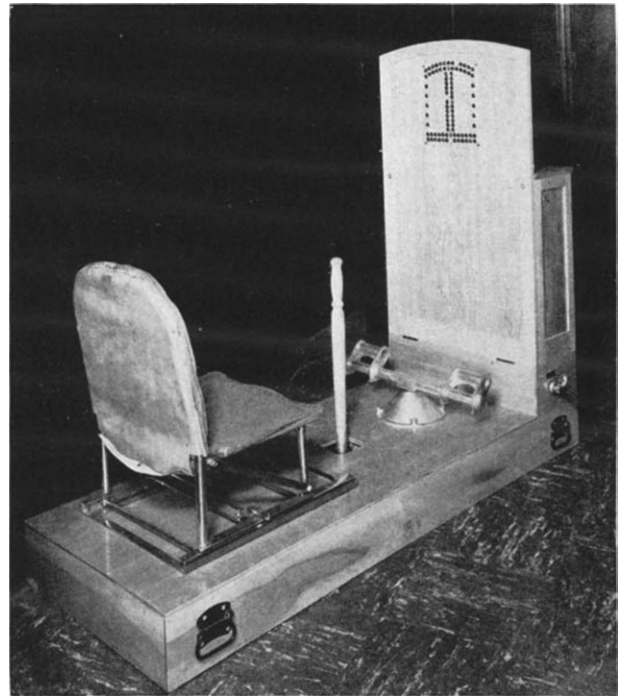
"Evidence... indicates the duty 'tradition' of the flight crew as a cause of pilot error. It is a coupling between men and machines which becomes less appropriate as more technical progress is made...

"[T]he need for up-dating the structure and duties of the flight crew becomes clear and urgent. Beyond this point, it is equally clear that the flight crew, and what they do, must be subordinate to the total flight system, altered as needed, to remain compatible."<sup>3</sup>

**APRIL 1944**

*Predicting flying success (Chief, Department of Psychology, Army Air Forces School of Aviation Medicine):* "Foremost among the pilot tests is the Complex Coördination Test [Fig. 1] which was described by Col. Neely Mashburn at a meeting of this Association in 1934... [and] now used in the AAF classification centers. The most remarkable fact about this test is that it is as efficient in the prediction of the flying success of aviation students now being processed by the Army Air Forces as it was years ago in the prediction of the flying success of cadets at Randolph Field."<sup>2</sup>

*Red light at night...aviator's delight? (Study for the National Research Council):* "In night flying the pilot shifts his gaze between the instrument panel and the environment external to the plane. These shifts, especially on moonless nights, involve adaptation from a relatively brightly lighted cockpit to a faintly illuminated or dark exterior... [A]djustment from light to dark is the more rapid



**Fig. 1.** School of Aviation Medicine complex coördination chair.

if the stimulus (bleaching) light is of low intensity. For maximal vision in low illumination, therefore, the retina should be completely dark adapted. In night flying with illuminated instruments this is of course not fully realized...

"A problem raised by this experiment is whether continued exposure to red light in the cockpit may not produce psychological disturbances or greater eye strain and fatigue than that occasioned by present methods of illumination. Such effects are not at all certain, though it is undoubtedly wise to explore all possibilities before recommending a change in practice...."<sup>4</sup>

**REFERENCES**

1. McCarthy GW, Stott JRR. In flight verification of the inversion illusion. *Aviat Space Environ Med.* 1994; 65(4):341–344.
2. Melton AW. The selection of pilots by means of psychomotor tests. *J Aviat Med.* 1944; 15(2):116–123.
3. Scucchi GD, Sells SB. Information load and three-man flight crews: an examination of the traditional organization in relation to current and developing airliners. *Aerosp Med.* 1969; 40(4):402–406.
4. Seitz CP, Orlansky J. A study in cockpit illumination. *J Aviat Med.* 1944; 15(2):136–137.

This column is prepared each month by Walter Dalitsch III, M.D., M.P.H. Most of the articles mentioned here were printed over the years in the official journal of the Aerospace Medical Association. These and other articles are available for download from Mira LibrarySmart via <https://submissions.miramart.com/asmaarchive/Login.aspx>.

Reprint & Copyright © by the Aerospace Medical Association, Alexandria, VA.

DOI: <https://doi.org/10.3357/AMHP.5337.2019>