

**MARCH 1992**

*New methods needed to combat G?* (Department of Physiology, Mayo Medical Center, Rochester, MN): "Objective recordings of respiratory and cardiovascular parameters at heart and head levels on human centrifuges and in flight provided the physiologic insights which led to development, during and shortly after World War II, of very effective anti-G suits and simultaneous use of positive pressure respiratory straining maneuvers. The high sustained  $G_z$  capabilities of current and future fighter planes have forced recourse to these techniques with minimal awareness of their origins. Possible catastrophic limitations of very effective full coverage anti-G suits, including water immersion to the apex of the thorax, especially when used without positive pressure breathing, were also documented at that time..."

"Known or new methods are needed for protection against or avoidance of the biophysical circumstances which produce G-LOV [G-induced loss of vision] and G-LOC. Widespread knowledge of the biophysical and resulting pathophysiologic effects responsible for  $G_z$ -induced sensory and cognitive losses, plus cooperation between all aspects of the aeronautical and biomedical communities and the undergirding basic sciences, will expedite solution of the G-LOC problem.

"If this note alerts at least a few members of these communities to these needs, it will have served its purpose."<sup>3</sup>

**MARCH 1967**

*Briefing passengers on the effects of pressure* (The Garrett Corporation, Los Angeles, CA): "Recommended rates of aircraft cabin pressurization changes have been unchanged for thirty years and are generally based on a statistically inadequate number of subjects exposed to changes in a pressure chamber done in the early days of aeromedical research. The research study presented here encompasses a larger group selected to be more representative of aircraft passengers flying today. The results indicate...[that]...adequate instruction of passengers regarding the cause for ear symptoms during pressure changes and appropriate advice regarding how to alleviate these symptoms is more important than the various rates of pressurization changes included in this study..."

"The significance of the fact there are more than three times the number of pathologic ear drums in the uninstructed group deserves consideration..."

"On reviewing commercial airline operations over the past years, it can be seen that before the advent of pressurized aircraft, many airlines had as a part of their briefing to passengers at the start of the flight a few sentences to say regarding how to relieve any 'plugged' sensation they might feel in their ears. Other airlines included an explanatory booklet regarding this condition and how to relieve it in the literature in the seat pocket. This practice was gradually dropped after pressurized aircraft became generally used throughout the industry. Considering the results of this study, the rapidly increasing number of young people becoming air travelers now, and the ascent and descent rates now possible

that were not possible with pressurized piston aircraft, it is felt it may be wise for commercial airlines to reintroduce the subject of pressure equalization to the flying public."<sup>2</sup>

**MARCH 1942**

*Staying warm aloft* (Aero Medical Research Unit, Air Corps, Wright Field, Dayton, OH): "Man is able to maintain a relatively constant body temperature under a wide variety of environmental conditions. To do this it is necessary to maintain a balance between heat gain by the body and heat loss from the body. This is accomplished ordinarily through certain reflex physiological mechanisms controlled by the heat regulatory center in the brain with the artificial assistance of clothing, the quality and quantity of which is adjusted roughly to the severity of the external conditions..."

"The final solution to the problem of maintaining body heat balance under the varied and extreme conditions encountered in flight is dependent to a great extent on future developments in airplane design. If pressure cabin airplanes are developed, the solution may lie in the heating of the cabin air together with some effective means of defrosting window areas in the cabin. As for the present, the best solution would seem to incorporate the best features of the electrically heated suit with the use of insulative clothing of maximum bulkiness commensurate with normal personal comfort and efficiency. Insulative clothing of moderate weight, such as the standard intermediate winter flying clothing, can be tolerated on all body areas except the hands which are needed for tactile operations. To keep the extremities warm and the body as a whole in heat balance, external heat could be applied with proper distribution beneath the insulative clothing. Heavy mittens could be carried as accessories or emergency equipment for protection in case of failure of the heating system or abandonment of the ship. This would provide adequate emergency protection, independent of the ship, for all except the most severely cold environmental conditions such as those encountered at very high altitudes and in the far north."<sup>1</sup>

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2. Waggoner JN. Human tolerance to changes in aircraft cabin pressurization. *Aerosp Med.* 1967; 38(3):299–301.
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