

**JANUARY 1993**

*The oldest 0-G surgery (Clifton Medical and Surgical Clinic Association, Clifton, TX; NASA-Johnson Space Center; and KRUG Life Sciences, Houston, TX):* "The first experience with animal surgery in microgravity has reinforced the importance of using animals in performing realistic evaluations of prototype hardware and procedures to form a surgical support system for Space Station Freedom. The observation of venous and arterial bleeding in microgravity indicates that local control methods are adequate to prevent cabin atmosphere contamination in most typical situations. A Surgical Overhead Canopy and a regional Laminar Flow Device were found to be extremely useful for more complex or contaminated procedures and should be developed further. The principles of restraint and management of supplies in microgravity are important to being able to perform standard surgical techniques successfully."<sup>2</sup>

*Commuter human factors (Johns Hopkins University, Baltimore, MD; Sunshine Aviation Safety Studies, Questa, NM):* "To provide a better understanding of the circumstances of crashes of scheduled commuter airplanes, National Transportation Safety Board data were analyzed for all cases of death, serious injury, or major damage involving commuter airplanes during 1983-418, when 172 people were killed and 207 injured in 118 events. Three-fourths of cases involved inadequate pilot performance, notably poor handling of emergencies and improper instrument flying procedures. Pilot errors occurred disproportionately in bad weather, which played a role in 30% of crashes... Certain airplanes were overinvolved in gear-up landings or in crashes due to fuel mismanagement."<sup>1</sup>

**JANUARY 1968**

*Blood volume of immobilization (Lahey Clinic Foundation and Boston University School of Medicine, Boston, MA; Canandaigua Medical Group, Canandaigua, NY):* "The blood volume of 11 subjects was measured by the use of sodium radiochromate to compare their conditions after long periods of immobilization with those following ambulation. The whole blood volume increased an average of 10.1 per cent with a range of -5.3 per cent to 30.9 per cent. The red blood cell volume increased an average of 8.6 per cent with a range of -6.3 per cent to 22.4 per cent..."

"This variation in blood volume is a homeostatic adaptation mechanism not fully elucidated, but it perhaps explains some of the postural changes noted in human subjects after space flights or in patients after prolonged bed rest."<sup>4</sup>

**JANUARY 1943**

*Dark adaptation (U.S. Navy):* "After careful study of all data available from reference sources by a Board designated by the Chief of Naval Operations directions have been issued as follows: to substitute red for blue in ships' lighting circuits, insure adequate vitamin A in ships' diets or by substitution; ship, aircraft and fire control instruments were ordered shifted over to red illumination;



**Fig. 1.** New dark adaptor lenses, developed by the Medical Research Section of the U.S. Navy's Bureau of Aeronautics. Three plastic polaroid goggles, with red lenses, enable pilots to work in the 'Ready Room' under full illumination and thus eliminate the 20- to 30-minute period usually spent in a dark room to condition their eyes for night flight (official U. S. Navy photograph).

and directions were written providing for 'issuance of preadaptation goggles [Fig. 1] as standard equipment for use of all deck, gunnery, and aviation officers, night lookouts, flight personnel and other naval personnel aboard ships and ashore whose efficient performance of duties largely depends upon properly or quickly adapting the eyes under severely adverse night conditions.' The goggles were to conform to specifications drafted originally by the Medical Research Section of the Bureau of Aeronautics."<sup>3</sup>

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