ice requiring a special lubricant has been the exposed bearings of military aircraft. These may be alternately roasted under tropical suns and chilled to perhaps 100 degrees below zero on nocturnal flights in zero weather.

Work in the laboratories of the International Lubricant Corporation was undertaken to establish a background for the fabrication of lubricants for such conditions, particularly as regards the role of different soap bases and different oil viscosities in determining the behavior of greases in ball-bearing service at low temperature. The method and apparatus for this investigation corresponded to the torque test of Army-Navy specification AN-G-3-42, using liquid nitrogen to produce very low temperatures. The oils used had Saybolt viscosities at 100° ranging from 34 to 100; the metal soap bases tried were aluminum, sodium, lithium, lead, calcium and barium.

In summary, it is stated that the low-temperature bearing torque characteristics of greases fabricated from different metal bases and low viscosity index oils appears to be dependent chiefly on the viscosity of the oil used. Barium greases seemed to stiffen somewhat above the average of the other greases tested. For barium greases, therefore, a lighter oil might be admissible. All the greases performed satisfactorily at 120° F., and there is currently little interest in greases for lower temperatures. Hence the limiting oil viscosity for greases satisfactory at 120° F. will be somewhere in the neighborhood of 36 to 40 seconds at 100° F.