

SURVIVING AN ANTARCTIC WINTER IN TENTS:
CLOTHING AND SHELTER ENVIRONMENTS UNDER SEVERE TEST

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This expedition was the first to undertake a complete overwintering in the Antarctic entirely in tents, and provided a hitherto unique opportunity to examine the microclimate within clothing, sleeping bags, and shelters in such extreme conditions. The island chosen lies off the western coast of the Antarctic Peninsula, north of the Antarctic Circle, and offered weather which was seldom extremely cold (absolute minima at sea level of the order of -20 degrees C), always wet (rain falling in every month), and frequently very windy (gales and above on one day in three).

Each of the twelve members of the overwintering party was instrumented for at least three full 24 hour periods during the nine-month winter phase, and most types of sleeping bag, tent and snow-hole were studied at least once. Thermistors were placed on the skin, between layers of clothing, and in ambient air, whilst normal base-camp routines were performed. Temperatures were recorded using two Grant Instruments data-logging systems, one onto pressure-sensitive chart paper, the other onto magnetic tape. Both proved very reliable even when subjected to shocks and the elements.

Skin temperatures, analysed by a variety of methods, demonstrated that whilst peripheral temperatures were often allowed to fall considerably during the day, they rose to 33 degrees C or more overnight. Central temperatures were maintained at levels of 30 degrees C or more almost all the time, with the exception of the thigh, which often cooled during the day. This consistency was achieved by matching clothing insulation to activity and environment. Temperatures inside tents rose to very high levels during cooking (sometimes in excess of 40 degrees C), but extreme layering resulted in steep gradients with height. Once the stove and lantern were turned off, temperatures fell rapidly to those outside, and the insulation provided by sleeping bags was required for warmth.

The clothing and tents used appeared to provide an acceptable environment for all the activities attempted during the expedition. Use of synthetic fibre filling for sleeping bags and garments resulted in adequate performance even when wet, and occasional warm sunny days were all that was required to dry them out periodically. It is suggested that away from the extreme cold of the main part of the Antarctic continent, man does not always require the extensive environmental support often used, and can survive very well with a much lighter logistic burden.