

2. INSTRUMENTATION AND OBSERVATION SITES

The temperatures were recorded with strings of thermistors frozen into the ice and read with a Wheatstone bridge (Tettex type). Platinum resistance elements were used for independent checking at selected points. The thermistors were calibrated to an accuracy of ± 0.1 deg and better; taking into account the instrument error of the bridge an absolute accuracy of ± 0.2 deg for all measured values can be claimed. Recalibration of the retrieved thermistors and comparison of the data with those obtained from the more stable platinum resistance elements (operating accuracy better than ± 0.1 deg) showed that no significant shift of the calibration values had taken place during the many years of field use. Though the temperature-measuring devices were individually connected to the surface and placed in specially designed casings to protect them against high pressure resulting from the freezing-in process and the differential movement of the ice masses over the years, none of them remained functional for longer than eight years.

The shallow holes were hand-drilled using a 3 inch (7.6 cm) Teflon-coated SIPRE coring auger. The three deep holes (to a maximum depth of 280 m) were drilled during the summer of 1974 with a most efficient new type of open system, hot-water drill, adapted from a design by Kasser, Röthlisberger and Iken. In this equipment, the water (local surface melt water), heated by two propane burners and pumped with a pressure of some 20 atmospheres through a rubber tube insulated with PVC, is released through a 4 mm jet at the end of the 2 m long drill head, which is stabilized with about 3 kg of lead grains. An advance rate of 25 m to 50 m per hour was achieved with the drill in the cold ice of the White Glacier.

The distribution of the temperature measurement sites on and in front of the White Glacier is shown in Figure 1. So far only one site—Beaver Camp—is permanently located in the accumulation area. Most sites are near or just below the mean equilibrium line. The annual equilibrium line changes its position widely from year to year; in 1962 it was found at an elevation of 1300 m while in 1964 it fell to only 400 m above sea level. The three temperature measurement sites in the Anniversary profile and the cluster of sites on the tongue are clearly in the ablation area.