bottom of the gas thermometer bulb. The pressure cell was placed inside this tube with soft solder. Near the top rim of the gas thermometer bulb several cavities were provided for housing the heater and the thermometer. The gas thermometer bulb, and the receptacles for heater, thermometer, and pressure cell were machined from one piece. This ensured good thermal conduction throughout. The relative positions of heater, thermometer, and pressure cell were so chosen as to avoid any disturbance of the heater or thermometer when the pressure cell was subjected to pressure.

The thermometer is described in § 2·2. The heater consisted of about 2000 Ω of manganin wire, wound on a small copper former which in turn was put with soft solder into one of the cavities. The lead wires for thermometer and heater were lacquered for a length of several centimetres to the calorimeter before leaving it. The lead wires were 36-gauge manganin wire between calorimeter and the liquid helium stage of the cryostat. From there on 34-gauge copper wire was used. The lead wires were brought into thermal contact with the adiabatic shield for about 30 cm. One of the potential leads of the heater was connected at the calorimeter, the other at the adiabatic shield.

The vapour pressure chamber had a volume of about 3 cm^3 and was placed on top of the gas thermometer bulb (figure 2). It is connected to two thin-wall cupro-nickel capillaries of 0·5 mm bore. Both capillaries as well as the high pressure capillaries leading to the pressure cell were wound into spirals 25 cm long before making thermal contact with the adiabatic shield. The gas thermometer bulb was connected to the outside through a thin wall cupro-nickel capillary of 0·3 mm bore; this capillary was brought out through the bottom of the adiabatic shield and the cryostat in order to keep the low temperature part of it as short as possible.

The cryostat contained a stage for liquid hydrogen and a stage for liquid helium. The high-pressure capillaries were thermally anchored for about 50 cm to the liquid helium stage. Under the pressures employed in this investigation the high pressure capillaries were therefore blocked by a plug of solid helium. This made it possible to measure the specific heat at virtually constant volume. The adiabatic shield had a heater of about 1000 Ω at F (figure 2). A differential thermocouple G (silver, 0·37 at. % gold/gold, 2·1 at.% cobalt) indicated the temperature difference between shield and calorimeter. The temperature of the shield was controlled semi-automatically so that the drift of the calorimeter was zero. The calorimeter was cooled to 20 °K by means of exchange gas. The exchange gas was then pumped off and further cooling was achieved by passing cold helium gas through the vapour pressure chamber. The lowest temperatures were obtained by liquefying some helium (^4He) in the vapour pressure chamber and then pumping it off. Measurements were started after a vacuum better than 5×10^{-6} mmHg was established in the vacuum line connected to the vapour pressure chamber for about 10 min.

The heat capacity measurements were made in the usual way. Heating intervals varied from about 0·06 deg near 3 °K to 0·6 deg near 30 °K. Measurements below about 3 °K were not feasible because the control of the shield temperature became increasingly difficult owing to the reduced sensitivity of the differential thermocouple.