

attained readily. However, below  $90^{\circ}\text{K}$  there is no simple equation relating resistivity and temperature for platinum wire. Thus for a comparison of the gas thermometers used by different laboratories, the gas thermometer scale is transferred to a special PRT scale point by point. Comparing gas thermometers in this manner agreement of better than  $.01^{\circ}\text{K}$  were reported by many laboratories.

Dr. Corruccini (N. B. S. ) suggested a three point calibration technique (below  $90^{\circ}\text{K}$ ) for interpolating between the calibration points. Other speakers indicated possible equations that may be useful for deriving a resistance - temperature curve for resistance thermometers made of very pure platinum where  $\frac{R_{\text{at } 100^{\circ}}}{R_{\text{at } 0^{\circ}}} = 1.3925$  or greater.

On Tuesday evening a Panel Discussion on Calibration was held. The panel consisted of members of the N. B. S. staff who answered questions raised by the attendees. These questions dealt with calibration techniques, probable accuracies that are obtainable with different types of thermometers and for different temperature ranges, and such non-technical topics as how long it takes the Bureau to calibrate thermometers and what back-log exists. Aside from questions dealing directly with calibration techniques (the answers to these may be found usually in one of the Bureaus publications) several interesting observations were made by the panelists. For a calibrated, standard instrument whose accuracy is to be maintained to the same degree that it was calibrated at the N. B. S. it should be hand carried from the Bureau instead of being shipped by common carrier. This is done with all standards that are used for comparisons with international standards or among the national standards laboratories.

Dr. Herzfeld, chairman of the Panel reiterated that the Bureau welcomes requests for standardization of measuring equipment even when it is not set up to carry out the measurements. To receive an appropriation from Congress for establishing a calibration facility the Bureau has to demonstrate a need for the facility. This is best done by having received numerous and repeated requests for the service.

Several problems that may occur when calibrating thermometers using the fixed defined points were also noted. It usually takes several days for sulfur baths to reach equilibrium. In addition since the sulfur point is a boiling point measurement, the vapor pressure must be very accurately measured also. Thus it is recommended that the zinc melting point be used instead. Similarly for calibrations using the triple point of water, approximately 24 hours may be needed for equilibrium to be reached.

For low temperature measurements ( $2^{\circ}$  -  $20^{\circ}\text{K}$ ) several semi conductor resistance thermometers have been used extensively. These are usually made of carbon