SUMMARY
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An experimental study around incipient region of nucleate-boiling was made for pool-boiling of Water, Isopropanol and Butanol on clean mercury, mirror finished nickel plated copper and brass surfaces. The investigations were mainly on the nucleation theories (transient conduction model) based on the concept of thermal boundary layer proposed by Hsu (18) and also by Han & Griffith (19). The major interests in the present investigations were along the following lines:

1. To study the nature of the temperature profile within the superheated thermal boundary layer adjacent to mercury-liquid and also solid-liquid boiling interfaces using a micro-thermocouple probe. (Chapters — III & IV)

2. Qualitative study of the nature of the temperature fluctuations within the boundary layer and quantitative measurements of the position as well as the magnitude of the maximum amplitude of temperature fluctuations, under given boiling conditions with the help of a galvanometric indicator. (Chapters — III & IV)

3. To measure the time averaged value of the fluctuating temperature within the boundary layer, using an programmable integrator with variable gain along with a digital display. (Chapters — III & IV)

4. From the measured time averaged temperature profile the extrapolated superheat layer thickness 'S' was determined. (Chapters — III & IV)
5. The nature and the thickness of the superheated layer were studied under various heat fluxes on three boiling surfaces (mercury, copper & brass). [Chapters — III & IV]

6. The nature of the boiling curves for boiling of three liquids on mercury, copper & brass surfaces were investigated and the data were correlated using Rohsenow equation (146). [Chapter — V]

7. Thermal boundary layer thickness and heat-transfer coefficient correlation equation based on hydrodynamical models proposed by Tien (20) was verified. [Chapter — VI]