arise from tritium gas and would require an alert monitor such as a flow-through ionization chamber, strategically sited. Chronic exposure problems could arise in water moderated reactors, luminizing workshops and certain laboratories, and biological monitoring was then probably the best system. Certain air sampling procedures involving water bubblers for tritiated water, condensation traps for tritiated water and carbon dioxide, and absorption on to molecular sieves could be used as the basis of fairly sensitive detectors for air contamination. The measurement of surface contamination caused by carbon-14 presented no technical problems, but there were grave problems in assessing accurately tritium contamination when it was necessary to rely either on smear sampling or on an ionization chamber held close to the surface to detect volatile surface contamination.

Liquid Helium

from a Correspondent

THE Low-Temperature Group of the Institute of Physics and the Physical Society combined its annual general meeting on June 18 with a series of papers on liquid helium.

Dr A. J. Leggatt (University of Sussex) discussed the λ transition in liquid helium. He reviewed the experimentally observed behaviour of the static properties in the critical region and basic theoretical ideas about the nature of the superfluid phase. The temperature dependencies of the superfluid density, intrinsic critical velocity and specific heat could be plausibly related by considering the idea of a correlation length tending to infinity at the λ point. However, there is at present no satisfactory microscopic explanation of this assumed temperature dependence.

Professor W. S. Vinen (University of Birmingham) continued by reviewing what is known about critical velocities in liquid helium II. He described the formation of vortices and discussed their role as nucleation centres. Subsequent discussion compared the critical conditions in type 2 superconductors with those in superfluid helium. Comparisons were also made between the generation of vortices in superfluids and the generation of dislocations in solids.

Dr J. Tilley (University of Sussex) gave the last morning paper on liquid helium films. He discussed first the general properties of saturated films and established that several different flow rates can occur at the same temperature, generally falling from a high to a lower value. Evidence has been found that flow rates may be quantized although the magnitude of the rate "quantum" is such that only quantum numbers from 9 upwards have been detected. The mechanism limiting superfluid flow through a film is not understood. Quantization of rates strongly suggests that vortex production is involved. In unsaturated films, effects which arise purely from the smallness of one dimension have not been uniquely identified. Attention has been fixed rather on the surface and what happens near to the wall. Brewer's experiments indicate that surface excitations contribute significantly to the specific heat of unsaturated films, and their existence may also explain the difference between the superfluid onset temperature and the temperature of the specific heat anomaly. There is new theoretical and experimental evidence for high mobility of atoms adjacent to the substrate challenging the idea that the layer of atoms next to the wall must be "solid".

The meeting continued after lunch with papers by Drs L. J. Challis and R. A. Sherlock (University of Nottingham) on Kapitza thermal boundary conductance. Dr Challis reviewed the present situation showing that the Kapitza conductance predicted by the Khalatnikov theory of phonon transition is too small and has the wrong dependence on θ_D. He suggested that perhaps a further explanation would be the continuous adsorption and de-adsorption of atoms on the surface. In discussing the size of the electronic component arising through interaction between electron and surface waves, Dr Challis concluded that while the conductance is probably negligible for a free electron metal above 0·01° K, for a real metal it may be measurable.

Dr Sherlock described measurements of Kapitza thermal boundary conductance to lead in the normal and superconductive states in the temperature range 1°–2° K. The normal state values were in essential agreement with those obtained by other workers. The final paper was given by Dr D. J. Sandiford (University of Manchester) on superfluidity in helium^3–helium^4 mixtures. He described the basic properties of the helium^3–helium^4 mixtures and discussed in detail the advances made in the understanding of the phase diagram during the past ten years.

Serum Lipoproteins

from a Correspondent

AN International Workshop of Serum Lipoproteins was held on May 10–12 at the University of Chicago. The meeting, attended by about forty participants, was intended to encourage exchange of ideas among investigators actively engaged in research on serum lipoproteins and related subjects.

Interesting new data were presented on the analysis of very low and low density lipoproteins of human serum by density gradient ultracentrifugation techniques. Computer programmes can help to give a better definition of the various components within each lipoprotein class. A major emphasis was placed on methods of isolation and characterization of the protein moieties of human serum low and high density lipoproteins (LDL or HDL). According to the results from various laboratories, these proteins can be prepared in an essentially lipid-free form and solubilized in aqueous buffers in appropriate experimental conditions. Data were presented to support the view that these proteins have a subunit structure, although size and chemical properties of each protein were not clearly defined.

The discussion on the human serum HDL protein subunit was particularly extensive. Estimates of molecular weight varying between 15,000 and 31,000 were presented and so was evidence for their heterogeneity, obtained by studies of their amino-acid composition, studies of C-terminal amino-acids and genetic studies. Some particularly interesting data indicated that HDL protein, deprived of its lipid moiety by treatment with organic solvents, retains its capacity to bind lipids. This is readily demonstrated with phospholipids and to a lesser extent with free cholesterol and glycerides. The two techniques of relipidation taken into consideration,

©1968 Nature Publishing Group