

anaemic patients. The low incidence of koilonychia and other nail changes in iron deficiency anaemia was one unexpected finding.

Others results suggest a changing pattern in the symptomatology of iron-deficiency anaemia. This may reflect a decrease in the chronicity and severity of iron deficiency at the present time.

#### DEMONSTRATION

**Techniques used in studies on nitrogen metabolism in ruminants.** By F. WHITE, G. WENHAM, A. D. HUGHES, J. MATHIESON and MARGARET I. CHALMERS, *Rowett Research Institute, Bucksburn, Aberdeen*

When urea was directly introduced into the rumen of sheep and rapidly mixed, it disappeared at a constant rate which was not affected by rumen pH or composition of the diet (Chalmers, Hughes and Jaffray). The rise in rumen pH associated with the introduction of urea was controlled by the simultaneous introduction of acetic acid. The use of different molar ratios of acetic acid to ammonia (derived from urea) made it possible to adjust the free ammonia concentration in the rumen and also the incidence and severity of toxicity.

Polythene intravenous cannulas have been inserted under general anaesthesia into (1) the right ruminal vein via a ventral branch then pushed forwards so that the tip of the cannula lies in the right ruminal vein approximately opposite the anterior edge of the rumen, and (2) the intestinal mesenteric vein via a branch, the cannula then pushed forward until the tip lies approximately 4 in. from the portal vein. Both cannulas are inserted through one incision in the right flank, brought to the dorsal end of the incision, then under the skin and exteriorized in the lumbar region. Maintenance consists of injecting heparin-saline 500 units/ml through the cannula at least once per day. It has been possible to do series of experiments on individual sheep over 3-month periods.

Adult sheep had 20 g urea administered directly into the rumen 90 min after the morning feed of concentrates. The following systems were monitored over 6 or 8 h: rumen pH, concentrations of urea, total and free ammonia in rumen fluid, concentrations of ammonia and urea in blood from ruminal, intestinal and jugular veins.

The demonstration will include the techniques and the results obtained.