IN THE Intermountain Area a major portion of the sheep and cattle subsist on open range (31). In the winter, they graze on semi-deserts (figure 1), in the spring and fall on foothills, and in the summer on the higher mountains. These ranges have a diversity of soil, climate, topography, and vegetation. Therefore, the animal's diet is usually highly variable. The diet may be deficient in essential nutrients or may actually contain an excess of certain constituents that are toxic or poisonous.

There are two main approaches to nutritional problems on range lands. The first is to measure the nutritive value of the plants which the animals consume. The phases included in this approach have been outlined by Harris et al. (30). They include (1) the determination of factors that affect the chemical composition of a given plant species on the range (13), (2) the botanical composition and nutritive content of the animal's diet (12, 16, 17, 18, 36, 54), and (3) the feeding of supplements to correct dietary deficiencies or toxicities (30, 56).

The second approach is to obtain animal measures which reflect the nutritive state of the animal, such as the nitrogen-creatinine ratio (10), animal condition, hypoproteinemia (51), blood phosphorus level, and vitamins A and carotene in the blood and liver (26). This approach has been highly developed in human medicine. However, more and better ways of measuring the nutritive status in animals need to be devised before this approach can be used efficiently.

Measuring Intake and Digestibility

Reviews on methods of determining intake and digestibility of herbage by grazing animals have been prepared by Schneider et al. (48), Vallentine (55), Reid and Kennedy (47), and Raymond et al. (45).

Basic methods—(1) Measurement of apparent digestibility of the forage by grazing animals in

Figure 1—Sheep grazing on winter desert range, south-central Utah. Note the sparsity of vegetation.