THE values of soil treatments, such as manure, phosphates, limestone, and other fertilizers, have usually been measured in terms of the increased yield of crops. Whenever the cost of the treatment is less than the sale value of the increased bulk, whether grain or forage, then the soil treatment is usually regarded as an acceptable farm practice. This assumption has been the basis of much of the experimental work with fertilizers and of many recommendations as to fertilizer use. Farmers, however, have been obliged to discount it for risks of weather, pests, crop diseases and prices. Hence with the commonly low and fluctuating monetary values from direct sale of field products, the margin of profit from treatments on many Missouri soils has frequently been small. This has not encouraged the additions of fertility to the soil as extensively as an approach to soil maintenance requires.

There has been only a little upward trend in fertilizer use despite the belief that fertilizer consumption in Missouri, for example, could be much increased with profitable results. In 1940, one and one-third million tons of limestone were used in the state, but even this amount is not sufficient to replace even the annual leaching loss of lime from the soil. With the decline of soil fertility recognized as the main cause of economic distress by only the few soil chemists, there is a serious need to translate soil fertility from a foreign language of chemical formulae and tonnage increase per acre, to one that speaks in terms of better animal growth and greater provision of more nourishing human food as antidotes for dangerous deficiency diseases that are ravaging and deforming both animal and human bodies.

Animal assays, or animal interpretations, of the value of soil treatments might encourage wider use of them for soil fertility maintenance and improvement.

**TREND TOWARD PASTORAL FARMING WITHOUT SOIL TREATMENT INVITES DISASTER**

In many instances farmers on thin, eroded soil applications of fertilizers, including lime, particularly with weather and insect hazards, have been nothing of their use on the pasture and hay fields which the acre yields remain unmeasured and not evaluated so commonly in immediate monetary returns. Since there is a rapidly gaining move toward more livestock or toward the pastoral system of farming, this indifferent attitude to soil maintenance is distressing. It will lead to low yields, less profit, greater soil depletion and devastating soil erosion. A continuation of this trend must result in a lowered economic status of farmers. It will make any future amelioration program more difficult. Any means, or any program, therefore, that may be used to demonstrate the value of soil treatment in this state at this time is highly desirable.

It has long been known that the chemical composition of any single forage or hay crop may be influenced by the degree of maturity or time of cutting, and by the kind of soil on which it is grown. When soil treatments are used, the flora of a pasture may be modified so as to bring in plants of feeding value for animals. Research in pasture improvement shows that the concentrations of minerals and carbohydrates in plants are changed by the application of different soil treatments. Such changes indicate that the use of fertilizers may have effects beyond recognition in weight of crops produced, and that have therefore not been widely recognized. Perhaps, Crampton and Finlayson, more than anyone else, have pointed to the value of bioassays of soil treatments.

From indications and suggestions by studies of the plant behavior through refined control of nutrients offered on colloidal clay growth media, it is believed that there are important benefits from soil fertility additions to soils that cannot be measured in terms of bulk increase in yield. The hypothesis is ventured that hidden benefits from soil treatments can be demonstrated through assays with smaller animals. For detection of these benefits, experimental studies of the plant behavior through refined control of nutrients offered on colloidal clay growth media...