muscular injection there is a risk that an abscess could form and remain undetected right up to the time of use of the meat. Even though such abscesses are very rare, the risk of loss of the prestige of the meat is one that should be avoided. Slight blemishes are sometimes left after subcutaneous injection, but these are less important, for they can be seen and trimmed off.

On farms where blackleg occurs there is a slight risk that an injection could carry spores of blackleg with dust from the skin and cause blackleg in the calf. Where blackleg has been known to occur injections should not be made unless calves have been vaccinated at least 2 weeks previously with blackleg vaccine.

Copper cerates have also proved to be convenient and suitable for sheep. The dose for sheep, arrived at in the same way as for cattle, is 150 mg. of copper glycinate, which provides 45 mg. of copper. With this dose the concentration of copper in a sheep's liver is increased by about 300 parts per million, which ensures enough copper for at least 12 months, even if the sheep is living on a diet which is very deficient in copper. Sheep are susceptible to poisoning by copper, and a cerate containing a cattle dose could poison a small sheep.

Since copper cerates are a satisfactory source of copper for both cattle and sheep, they can be used as an alternative to other methods for controlling copper deficiency. Their special value is for treatment of animals on areas where conventional methods of supplying copper are too expensive. The instance of molybdenum-rich pastures has been discussed in this article.

Where Disease May Occur

There are fairly large areas in New Zealand which produce pastures high in molybdenum and a list of the soils on which they grow is given in Table 3 with the approximate area of each soil where this is known. Disease in cattle controllable by supplying copper has been diagnosed on farms situated on those soils marked by an asterisk. The symptoms vary for different soils. For example, on peat soils the whole herd may be affected with acute spring scouring, while on Tuai coarse sand between Wairoa and Lake Waikaremoana the main problem is the greying of weaners already described.

The similarity of the chemical composition of pastures from the soils listed in Table 3 suggests the strong possibility that disease controllable by supplying copper could occur on any farm situated on any one of the soils. It is, indeed, likely that such diseases already occur but have been overlooked because they might not recur every year and because the unthriftiness, the greying, or the scouring have not been recognised as signs of a disease.

TABLE 3—COPPER AND MOLYBDENUM CONTENT OF SOILS WHICH PRODUCE PASTURES HIGH IN MOLYBDENUM

	Average content		Approximate area
	Copper	Molybdenum	
	parts per million		acres
NORTH ISLAND			
*Rotomahana sandy loam	8.0	6.5	4,500
*Peat soils	6.9	11.7	300,000
Tukituki set	10.4	5.2	93,000
*Opiki complex	11.8	5.5	17,000
*Konoti clay loam, hill soils	8.5	5.7	23,000
*Tuai coarse sands	8.0	7.8	200,000
*Tihoi-Opa complex	7.1	6.1	36,000
*Tihoi sand	5.1	4.6	
Maramaru coarse sands	8.0	5.5	10,000
Taumarunui sandy silt, hill soils	10.7	8.0	8,000
Matawai sandy loam	9.5	8.3	19,000
*Ahuriri soils	8.0	7.9	8,000
Waihua stony sandy loam	7.9	8.7	78,000
SOUTH ISLAND			
*Motukarara sandy loam, weakly saline phase	7.0	3.0	
Omihi silt loam	6.3	4.4	
*Weka sandy loam	3.9	4.5	

* Disease in cattle controllable by supplying copper diagnosed on farms on these soils.

The situation now is changed. It is known that when these signs occur in cattle it is probable that they are caused by too much molybdenum and too little copper in the fodder, and that probability is very high indeed if the cattle are kept on any of the soils named. It is advisable therefore for farmers on these soils to keep this probability in mind when inspecting their stock. Copper cerates are effective and economical for treatment of single animals or whole herds.

The locations of the North Island soils in Table 3 are shown as black areas on the map on page 221. No map of the South Island soils is yet available, so these cannot be shown in the same way. The map is not on a big enough scale to show whether any particular farm is situated on one of the soils, but it does allow some estimate of that possibility to be made. A talk with the Instructor in Agriculture for the district will settle the question.

N.Z. Grassland Association Conference

THE first conference to be held in the new Ruakura Farmers' Hall at the Department of Agriculture's Ruakura Animal Research Station, Hamilton, will be the nineteenth conference of the New Zealand Grassland Association from 15 October to 17 October. Between 500 and 600 people are expected to attend the conference. The programme is as follows:—

15 October: Opening address by the president, S. H. Saxby, Assistant Director, Extension Division, Department of Agriculture, Wellington. "Aspects of Soil Moisture", D. S. Rickard, Winchmore Irrigation Research Station. "The Water Requirements and Management of Irrigated Pastures", H. G. Hopewell, Rukuhia Soil Research Station. "Mechanics of Spray Irrigation", B. R. Homersham, engineer, Christchurch. "Economics of Spray Irrigation", J. M. Miller, Department of Agriculture, Hamilton.

16 October: "Results of Survey of Use of Short-rotation Ryegrass", R. H. Scott, Department of Agriculture, Wellington. "The Use of Short-rotation Ryegrass on a Bay of Plenty Farm", H. T. Titterton, Bay of Plenty farmer. "The Use of Short-rotation Ryegrass at Lincoln College", C. E. Iversen, Canterbury Agricultural College. "The Use of Short-rotation Ryegrass on a Manawatu Fat Lamb Farm", D. R. Willis, Greatford farmer.

In the afternoon there will be a field trip to the irrigation experimental area at Rukuhia Soil Research Station and to Ruakura Animal Research Station. The annual meeting of the association will be held at the Winter Garden, Anglesea Street, Hamilton, in the evening.

17 October: "Investigations with *Lotus* Species", P. C. Barclay, Grasslands Division, Department of Scientific and Industrial Research, Palmerston North. "The Influence of Treading on Pastures", D. Edmond, Grasslands Division, Department of Scientific and Industrial Research, Palmerston North. "The Use of Chemicals to Aid Crop and Pasture Establishment", L. J. Matthews, Department of Agriculture, Wellington. "A Discussion on the Rates of Grass Seeding and Manuring of New Pastures Sown Down under Varying Conditions of Soil Fertility and Farm Management", A. V. Allo and B. T. Jordan, Department of Agriculture, Tauranga. "Establishing and Maintaining Swards on Airstrips on Farms in Auckland Province", E. H. Arnold, Department of Agriculture, Auckland. "Some Factors that Influence the Rate of Growth of Pastures", R. W. Brougham, Grasslands Division, Department of Scientific and Industrial Research, Palmerston North. "Sulphur Responses on Pastures", T. W. Walker, Canterbury Agricultural College. "Some Aspects of Germination Analysis", A. V. Lithgow, Seed-testing Station, Department of Agriculture, Palmerston North.