

in some cases jaundice and redwater. In some lambs the copper levels of the liver were within the copper poisoning range and in one field case arsenic analysis of the liver was high enough to support a diagnosis of arsenical poisoning. The most constant finding on post-mortem examination was evidence of quite severe kidney damage and this was also supported by blood non-protein nitrogen determinations, which rose to extremely high levels.

Dosing Trials

Following reports of mortalities in the field dosing trials were carried out at Wallaceville to determine the following points:—

1. If copper methylarsenate was toxic for lambs.
2. The effect of a normal dose on lambs under varying conditions.

The first trial involved the use of five lambs in the 30lb. to 40lb. body-weight range and they were given 1, 2, 3, 4, and 5 tablets respectively. Of these only those receiving 3 and 5 tablets died at the third and fifth days and the remaining lambs survived. As the normal dose for lambs of this weight would have been 1 tablet only, this trial indicated that there was a reasonable margin of safety.

In the second trial 12 lambs ranging in weight from 40lb. to 75lb. were used and all were given the recommended

dose of 2 tablets each. Six of these lambs were kept away from water for 3 days before dosing while the remaining six had free access to water for the whole time. All lambs were on dry feed at the time of dosing. Of these only one lamb weighing 44lb. which had free access to water died 9 days after dosing. The remaining 11 lambs were allowed free access to water and given a further 2 tablets of copper methylarsenate 19 days after the first dose, and one animal died 8 days after the second treatment. Under field conditions favourable to the survival of the large stomach worm it is often necessary to dose at short intervals, and this trial indicates that repeated dosing with copper methylarsenate would be risky.

In the third trial unthrifty lambs were used and all were withheld from water for 4 days before they were dosed with 2 tablets each. Two lambs died at 7 days after dosing, one at 10 days, one at 14 days, and the remaining two were extremely poor when killed at 19 days.

This trial showed that if stock are deprived of adequate water supplies, the use of copper methylarsenate cannot be recommended. Though the conditions imposed in the trials were rather rigid, it is possible to find such sheep in the field. Not all farms have water freely available and sheep may become dehydrated rapidly by scouring.

Analytical work carried out on the experimental lambs indicated that the arsenic was rapidly excreted by the kidneys. Any condition which prevents this rapid excretion renders the animal susceptible to kidney damage by the retained arsenic. Where the time interval between dosing and death was beyond 5 to 6 days, it was found that the liver arsenic at this time was very low, but in most cases the amount in the kidneys was relatively high.

To arrive at a diagnosis by chemical analysis in cases of suspected toxicity it is essential to get kidney in addition to liver and these should be collected from the first animals which die after dosing.

Though under normal conditions copper methylarsenate is comparatively safe, field and experimental results show that when used under certain conditions it is poisonous for lambs. The mode of action of the compound is different from a simple arsenic poisoning caused by inorganic arsenic. The main damage caused by its action is located in the kidneys and under certain conditions which occur in the field the margin of safety is far too slender for it to be recommended for general use.

—R. M. SALISBURY, Chief Diagnostic Officer, and E. L. J. STAPLES, Technical Officer, Department of Agriculture Animal Research Station, Wallaceville

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of April:—

NORTH ISLAND

January

- 1 January—Nuhaka A. and P. at Nuhaka.
 17 and 18 January—Feilding I., A., and P. at Feilding.
 *17 and 18 January—Wairoa County A. and P. at Wairoa.
 24 and 25 January—Horowhenua A. and P. at Levin.
 25 January—Central Hawke's Bay A. and P. at Waipukurau.
 *25 January—North Kaipara A. and P. at Paparoa.
 29 January—Marton District A. and P. at Marton.
 *31 January and 1 February—Rodney A. and P. at Warkworth.

February

- 1 February—Otorohanga A. and P. at Otorohanga.
 1 February—Rangitikei A. and P. at Taihape.
 6 February—Matamata A. and P. at Matamata.
 7 and 8 February—Taranaki A. and P. at New Plymouth.
 *7 and 8 February—Taumarunui and District A. and P. at Taumarunui.
 8 February—Hukerenui A. and P. at Hukerenui.
 8 February—Woodville A. and P. at Woodville.
 11 and 12 February—Dannevirke District A. and P. at Dannevirke.
 12 February—Te Awamutu A. and P. at Te Awamutu.
 14 and 15 February—Franklin A. and P. at Pukekohe.

- *14 and 15 February—Ohura A., P., H., and I. at Niho Niho.
 15 February—Waiapu P. and I. at Ruatoria.
 15 February—Pahiatua A. and P. at Pahiatua.
 15 February—Northern Wairoa A. and P. at Mititai.
 15 February—Opotiki A. and P. at Opotiki.
 21 and 22 February—Masterton A. and P. at Masterton.
 *21 and 22 February—Te Kuiti and District A. and P. at Te Kuiti.
 22 February—Putaruru A. and P. at Putaruru.
 22 February—Whakatane A. and P. at Whakatane.
 26 February—Morrinsville A. and P. at Morrinsville.
 *28 February and 1 March—Wellington and Hutt Valley A. and P. at Trentham.

March

- 1 March—Waiotira Junction A. and P. at Waiotira.
 1 March—Mangonui County A. and P. at Kaitiaki.
 1 March—Albany A. and P. at Albany.
 1 March—Te Puke A. and P. at Te Puke.
 8 March—Kumeu A. and P. at Kumeu.
 8 March—Tauranga A. and P. at Tauranga.
 *15 March—Wellsford A. and P. at Wellsford.
 15 March—Hawke's Bay A. and P. at Hastings.
 22 March—Poverty Bay Autumn Carnival at Gisborne.

SOUTH ISLAND

January

- 11 January—Blueskin A. and P. at Waitati.
 18 January—Waikouaiti A. and P. at Waikouaiti.

- 25 January—Waiapu A. and P. at Tuatapere.
 *25 January—Golden Bay A. and P. at Takaka.
 26 January—Peninsula Horse Show and A. and P. at Duvauchelle, Banks Peninsula.
 28 and 29 January—Otago A. and P. at Dunedin.

February

- 1 February—Banks Peninsula A. and P. at Little River.
 8 February—Palmerston and Waihemo A. and P. at Palmerston.
 15 February—Murchison A. and P. at Murchison.
 15 February—Inangahua A. and P. and Sports at Reefton.
 22 February—Maniototo A. and P. at Ranfurly.
 *22 February—Kaikoura A. and P. at Kaikoura.

March

- *1 March—Temuka and Geraldine A. and P. at Winchester.
 8 March—Cheviot A. and P. at Cheviot.
 *8 March—Mount Benger A. and P. at Roxburgh.
 15 March—Hawarden A. and P. at Hawarden.
 *15 March—Upper Clutha A. and P. at Wanaka.
 22 March—Mayfield A. and P. at Mayfield.
 *29 March—Methven A. and P. at Methven.

April

- 7 April—Strath Taieri A. and P. at Middlemarch.
 7 April—Mackenzie County Highland Show at Fairlie.
 12 April—Oxford A. and P. at Oxford.
 *19 April—Malvern A. and P. at Sheffield.

*The Department of Agriculture exhibit will be staged at this show.