

and thionol is less efficient than in sheep, so that even on low doses sulphoxide remains in the blood of pigs and calves and appears to pass readily into the aqueous humour. Only after administration of amounts of phenothiazine greatly in excess of the recommended dose has the sulphoxide been found in the blood and aqueous humour of sheep.

Examination of urine of animals dosed with phenothiazine has led to the discovery of several conjugates of phenothiazine derivatives hitherto not reported. In bobby calves a large part of the excreted derivatives consists of a protein conjugate of phenothiazone. Analysis of this protein has revealed the presence of at least six amino-acids, including arginine, tyrosine, and glutamic acid. With older calves much less of this conjugate was found, the pigments being probably excreted as compounds of glucuronic acid. In sheep, evidence of the presence of both the ethereal sulphate and the glucuronide of phenothiazone has been obtained. In urine passed within four hours of dosing, a new unidentified conjugate of phenothiazone has been found, and such urine also yields a large amount of phenothiazine on acidification.

The *in vitro* preparation of phenothiazine sulphoxide has been improved, and a quantity of this compound obtained for tests of anthelmintic activity.

TOXICOLOGY

In the autumn and winter of 1946 work was carried out with the Government Veterinarian, Hastings, on suspected poisoning of cattle by variegated thistle (*Silybum marianum*) and winged thistle (*Carduus tenuifloris*). The evidence obtained indicates that these thistles may become a serious menace to cattle if allowed to spread. The toxic principle, potassium nitrate, was determined in some specimens.

Poisoning of cattle and pigs by raw mangels was again encountered.

Some work has been carried out on the suitability of *Eschscholtzia californica* as a fodder for sheep. The plant causes no mortality in the Southland district, where it grows on waste land, but one sheep died on a small plot grown at Wallaceville. The plant contains high concentrations of HCN and is therefore potentially dangerous to stock. Samples from Wallaceville and from Southland contained up to 0.095 per cent. total HCN in the green material. In the course of this work a new technique was devised for determination of HCN in green material without loss due to enzyme action. The method is to disintegrate the plant substance in a Waring blender in the presence of mercuric chloride.

APICULTURE

Work carried out with the Senior Apiary Instructor and Honey-grader has resulted in the designing of a satisfactory plant for the removal of excess moisture from honey, so improving its keeping-qualities. The plant operates on the principle of removing excess moisture by indirect heating and drying of the honey. A plant has been in commercial operation throughout the season.

It was discovered that the cause of "spring dwindling," or reduction of hive strength by disappearance of field bees in the spring, was *Nosema apis*, a protozoan parasite. Experimental feeding of drugs to hives, in an effort to combat the disease, was commenced in collaboration with the Apiary Instructors.

Further work in connection with toxic honey and on pollen supplements was carried out.