

Much time has been spent in perfecting methods for the determination of sugars in tobacco. The clearing of the solutions prior to the estimation of sugars has presented many difficulties. The use of cadmium sulphate as a clearing-agent has been tested, with promising results.

Some twenty-three samples of Nelson leaf have been examined for reducing sugars and nitrogen contents. The amounts of these constituents varied greatly in different samples of leaf. A range in reducing sugars from 2.0 per cent. to 30.9 per cent. was found. The total nitrogen contents varied in different samples from 1.48 to 4.27 per cent. The ratio of reducing sugars to total nitrogen ranged from 0.5 to 20.9, there being a distinct tendency for good-quality tobacco to give a high ratio. Typical figures for poor- and high-quality tobacco are shown below:—

Sample No.	Quality Tobacco.	Total Sugars.	Total Nitrogen.	Ratio, Sugar/Nitrogen.
		Per Cent.	Per Cent.	
T 33 .. ..	Good .. ..	20.03	1.93	10.3
T 35 .. ..	Poor .. ..	8.73	2.60	3.3

Further samples must be analysed before conclusions can be drawn regarding the value of the sugar/nitrogen ratio in assessing tobacco quality.

*Nicotine in Tobacco.*—With a view to the manufacture of nicotine sulphate in New Zealand, estimations of nicotine have been made in typical samples of Nelson tobacco. In addition, determinations have been made of nicotine in samples of Turkish tobacco which is known to have a fairly high nicotine content. A typical figure for waste Nelson tobacco-leaf was 2.67 per cent. nicotine, while samples of Turkish leaf grown at the Research Station showed variations in nicotine content from 3.87 per cent. to 7.02 per cent. in the leaf and from 0.92 per cent. to 1.25 per cent. in the stalks. The nicotine content of the Turkish leaf was considerably lower than that reported by analysts from other centres. Soil type and manurial treatment doubtless influence greatly the nicotine content of this variety.

*Industrial Recovery of Nicotine.*—A report has been prepared on the possibility of establishing in New Zealand the manufacture of nicotine sulphate, and in collaboration with the Tobacco Research Officer and the Fruitgrowers' Chemical Co. at Mapua a series of experiments on the steam distillation of nicotine from waste tobacco has been carried out.

Estimations of nicotine in the distillate from these tests showed that a relatively large volume of distillate was required to remove the nicotine from the tobacco. It is possible that better results would have been obtained by distillation under pressure. An alternative procedure for the extracting of nicotine from tobacco by the use of organic solvents is now under consideration, and preliminary work on the distribution coefficients of nicotine between water and organic solvents is being carried out in the laboratory.

*Moisture Uptake of Tobacco.*—Considerable variation in the rate of absorption of water by tobacco and also in the final moisture contents has been found in different tobacco samples when introduced into a water-saturated atmosphere.

In some cases samples of tobacco-leaf have absorbed up to 90 per cent. of their weight of moisture, while in others the percentage increase in weight has been 51 per cent. only. In view of the importance of these observations to the manufacturer, further studies of moisture absorption at known humidities are being made.

#### MYCOLOGICAL INVESTIGATIONS.

*Damping-off Fungi.*—As in previous years, the mycologist regularly inspected the tobacco seedlings grown by Nelson nurserymen for commercial use. In certain cases considerable damage to seedlings was caused by damping-off fungi. The importance of thorough sterilization of soil as well as disinfection of boxes and glasshouses used for the propagation of tobacco seedlings must be again emphasized. No less important to success in the rearing of healthy plants free from disease is satisfactory ventilation of glasshouses and the maintenance of dry conditions on the floor of the houses.

Preliminary tests have been conducted with eight different chemicals, including organic mercury derivatives and cheshunt compound, with a view to their use in the seedling-boxes for the control of damping-off fungi.

Of the chemicals used, red copper oxide detrimentally affected the germination of tobacco-seed and therefore must be considered unsuitable for use in seed-boxes. The other chemicals exerted no detrimental effect on seed-germination, but no statement can yet be made concerning their value in the control of damping-off fungi.

*Effect of Steam Sterilization of the Soil on Seed-germination.*—The introduction of steam sterilization for the treatment of tobacco-seedling beds has raised the question as to the effect of such treatment on the germination of tobacco-seed.

In the case of tomato soils a resting period after sterilization has been recommended prior to the planting-out of tomatoes. Experiments were therefore initiated to ascertain the effect of steam sterilization on the germination of tobacco-seed in the case of a typical tobacco soil. Four sowings of tobacco-seed were made at weekly intervals on the sterilized soil, commencing one week after sterilization and extending over a period of one month. In every case a thick stand of tobacco seedlings was obtained, indicating that no advantage was secured by allowing more than one week's interval