

EXPERIMENTAL REFRIGERATED GAS-STORE.

A relatively small but completely equipped, electrically-operated, and automatically-controlled refrigerated gas-store of three chambers has been installed at the Dominion Laboratory, and preliminary experiments on the gas storage of New Zealand apples are being undertaken. Two varieties of apples are being used, the trials being conducted at three different concentrations of CO_2 and at three different temperatures. The experiments have not been in progress long enough to give any reliable indication of the ultimate result.

TRANSPORT TRIALS.

(1) *Tower Dunnage on s.s. "Turakina"*.—A demonstration shipment of apples stowed on the "tower" system devised by Dr. A. J. Smith, of the Cambridge Low Temperature Research Station, was loaded on the "Turakina" at Nelson for London in March, 1936, and twenty-four thermographs were placed at selected stations throughout the hold to record automatically the temperatures. The fruit was in good condition when discharged, and the numerous flesh temperatures which were taken supported evidence obtained from previous trials of this method of stowage, and it is now officially considered that the "tower" system as demonstrated on this vessel—also on the "Port Nicholson" mentioned in item (3) hereunder—is likely to give consistently satisfactory results for vessels using overhead grids and suitable brine temperatures. As the records of temperature made by the thermographs were, in general, and for the extended scientific research work of to-day, below the requirements, it has been recommended that in future experiments on overseas vessels the modern multi-point electric thermometer be used exclusively.

(2) *No-dunnage Trial on m.v. "Australia Star"*.—To obtain a reasonably fair comparison on a modern overseas vessel of the "no-dunnage" system with an ordinary dunnage method of stowage and transport of fruit, approximately 19,200 bushel cases of apples in No. 4 lower hold and 19,500 in No. 4 'tween deck were carried by the m.v. "Australia Star" to London in April, 1936, and temperature readings by a 24-point electric distant-reading thermometer unit were taken throughout the voyage at twelve stations in each of the two holds.

After a careful investigation and extensive examination of the apples in the respective holds upon arrival in London it was found that the temperature distribution and the condition of the fruit were both satisfactory and there was no indication that the omission of dunnage in this lower hold, which has an efficient vertical forced air circulation, had had any adverse effect. In this connection special mention should be made of the excellent stowage throughout the lower hold.

(3) *Dearden No. 1 Method of Dunnage on s.s. "Port Nicholson"*.—This trial, which was undertaken in No. 1 lower hold of the s.s. "Port Nicholson," was of very little practical value, first owing to the general unsuitability of a No. 1 lower hold for a systematic stow of cases of fruit, and secondly because numerous open spaces foreign to the system existed throughout the stow as a resultant effect of the then existing difficulty and difference of viewpoint regarding the conditions to be met in the loading of overseas vessels at Wellington.

Use of Oiled Wraps in the Control of Superficial Scald on Granny Smith Apples.—Wastage of Granny Smith apples during cold storage has been a matter of concern for some years. Local experiments were first undertaken in 1934 season and are still incomplete. It would appear that locality of the orchard is a significant factor, also that less mature apples develop scald earlier than the more mature, while oiled wraps, irrespective of locality and maturity influences, have a definite controlling effect.

Influence of Fertilizer Treatment in relation to Bitter-pit in Cox's Orange Pippins.—This storage experiment, the details of which are given in Covent Garden Paper, New Zealand, No. 5, was with thirty-six cases of Cox's Orange pippin from the Research Orchard, Nelson, and indicated that the development of bitter-pit is probably significantly affected by extra manurial treatment in the form of sulphate of potash and sulphate of ammonia, and gave a measure of agreement with some previous results published by Dr. T. Wallace, of the Long Ashton Research Station.

Effect of Fertilizer Treatment on the General Keeping-quality of Apples.—In the 1935 season Cox's and Sturmer apples from manurial plots at Mapua were specially stored and examined, and this experiment was extended to Delicious from the plots at Auckland and Sturmers and Delicious from Hastings, which had received the same fertilizer treatments over the same period of years as those at Mapua.

Regarding the Cox's, the results indicated that while fungal rotting was more or less general in all the samples, bitter-pit was more pronounced for potash treatment and there was no internal breakdown from any plot. There was slight internal browning in one lot of Sturmers from Mapua, but all the Sturmers from Hastings were affected and this disease was also very prevalent in the Hastings grown Sturmers held in local commercial cool-stores; the abnormal rainfall in the district of 21.91 in. for the first three months of 1936 may have rendered this variety less resistant to internal breakdown.

The Delicious apples from Auckland were badly affected by mouldy core, but those from Hastings were sound and in excellent condition. In neither case was there any indication during the storage period that the various manurial treatments influenced the condition of the fruit.

Use of Copper-sulphate-treated Wraps in Control of Spread of Grey Mould (Botrytis Rots) on Winter Cole Pears.—For this experiment thirty-six cases of Winter Cole pears were obtained, twelve each from Nelson, Canterbury, and Hastings. Half the fruit was wrapped in copper-sulphate wraps and the other half in plain wraps, and was held for seven months at a temperature of 30° to 32° F.

Three examinations were made, and on all occasions *Botrytis* was non-existent and these experimental pears finished 100 per cent. sound. In so far as the relative influence of the two kinds of wraps was concerned, the result was negative, but the experiment showed that clean, sound pears properly handled are not so liable under the same storage conditions to develop rots as inferior fruit improperly handled.