FUEL RESEARCH.

Advisory Committee: Colonel W. D. Holgate (Chairman), Professor H. G. Denham, Mr. C. C. Davis, Mr. W. Donovan, Mr. W. A. Flavell, Mr. A. H. Kimbell, Mr. H. Vickerman, Mr. T. O. Bishop (Secretary, Coal-mine Owners' Federation), Dr. E. Marsden (Secretary, Fuel Research Committee).

Laboratory Staff: W. A. Joiner, M.Sc. A.I.C.; W. G. Hughson, M.Sc. A.I.C.; A. K. R. McDowell, M.Sc. A.I.C.

During the year the investigation of the low-temperature carbonization of New Zealand coals has been extended to coal of the bituminous class. The Fischer rotary retort, taking a charge of 35 lb. of raw coal, has been employed in these experiments, but some alteration to the condensing and recovery part of the apparatus was necessary. Millerton and Blackball coals, both from the West Coast, were chosen for investigation, and the yields and nature of the products determined. Since both coals contain appreciable percentages of sulphur, more especially Blackball coal, particular attention was paid to its determination in the products of carbonization. The tar-oil was examined by the usual methods, and analyses made of the semi-coke, gas, and liquor. Both Millerton and Blackball are coking coals and yield free-burning smokeless fuels. Millerton coal produces rather a swollen coke, but this could be obviated by blending with suitable non-coking coal. It may be noted that Blackball coal gave a high yield of low-temperature tar-oil—viz., 39 gallons per ton. The carbonization investigations have been completed and a report on Millerton and Blackball coals is now in the press.

One of the staff (Mr. W. G. Hughson) assisted with further trials conducted by the Railway Department on the use of New Zealand coals, and, in addition, a considerable number of coal analyses were carried out at the Laboratory in connection with these. On completion of the carbonizing tests some briquetting experiments were commenced, using carbonized residue from Waikato coal with various binders. These are still in progress.

Since very little is known regarding the composition of low-temperature tar-oils, a fairly comprehensive examination of the tar-oil from Waikato coal has been undertaken and is proceeding at the present time.

COLD-STORAGE RESEARCH: FRUIT.

Advisory Committee: Mr. J. A. Campbell (Chairman), Messrs. F. W. Grainger, L. W. Tiller, A. M. Robertson, R. Sutherland, W. Benzies, F. R. Callaghan, Dr. M. A. F. Barnett, Captain W. Olphert, and the late Captain T. H. Chudley.

It is with regret that the death of Captain T. H. Chudley, a respected member of the Fruit Cold Storage Committee, is recorded.

Overseas' Investigations.—During the past year only a restricted amount of overseas cold-storage investigations was undertaken, and was concerned largely with investigations relating to the carriage of Worcester Pearmains, and to the use of an all-round wrap and oil-paper wraps in the transport of different varieties. These experiments have not reached a stage at which a report can yet be furnished.

Land Store Investigations.—These were continued at Nelson, the work being dealt with by the staff of the Cawthron Institute.

REPORT ON THE FRUIT COLD-STORAGE RESEARCH WORK OF THE CAWTHRON INSTITUTE, 1930–31.

The work for the year can be broadly divided into two sections, one having a direct bearing on the overseas transport conditions for New Zealand fruit, and the other dealing more particularly with the effect of pre-storage factors on the resistance of the apple to the various diseases associated with cold storage.

The experiments of the first section are a continuation of the work of 1929 on the determination of the reaction of some of our export varieties of apples to storage temperature. The Cox's Orange Pippin and the Jonathan have been studied a little more fully than in the previous season, as the indications are that these two varieties are more difficult to carry satisfactorily than are the other main varieties. Cleopatra and Rome Beauty are two additional varieties that have been included in the experiments this year, and small-scale tests also have been carried out with Worcester Pearmain, Lord Wolseley, and Grannie Smith.

Considerable difference has been found in the keeping-quality of Cox's Orange from two different types of soil, but the indications of last year that 38° F. is a safer carriage temperature for this variety than 32° F. or 35° F. have been given further support.

With the Jonathan, deep scald was considerably more severe than was the case last season, and as a consequence the disease was much in evidence at a temperature of 35° F. The fruit stored at 38° F. was almost completely free from the trouble. It would seem, therefore, that until more is known of the conditions under which apples become susceptible to deep scald it would be wise to carry the Jonathan at a temperature rather higher than 35° F.

The Cleopatra and Rome Beauty both appear to be tolerant of a wide range of temperature, keeping well both at 32° F. and at 38° F.

In the small-scale tests the Grannie Smith kept perfectly under all three storage temperatures. The Worcester Pearmain also kept fairly well at all three temperatures and, being of a late picking, developed practically no bitter-pit.

In a private communication, Dr. Barker, of the Cambridge Low-temperature Station, has drawn attention to a peculiar superficial spotting disease which was noticed in England, particularly with the Lord Wolseley variety and with the Cleopatra, on New Zealand apples that were exposed in shop-