

PLANT DISEASES DIVISION

Work has mainly been directed towards investigations into, and control of, moulds in State houses. Preliminary work showed that discoloration of ceilings and walls was caused by various species of fungi, mainly *Cladosporium herbarum*, and to a lesser extent several species of *Penicillium* and *Aspergillus*. It was found by experiment that these organisms developed upon the glue used for sizing gypsum plaster-board employed as lining for walls and ceilings, casein used as a binding medium for water distemper, and flour paste employed to attach wallpaper, since they did not grow upon gypsum plaster-board alone. Investigations were then directed towards finding means of proofing such substances against mould attack. It was found ultimately that a 2 per cent. concentration of sodium pentachlorophenate completely inhibited mould growth when added to glue size, casein distempers, and flour paste.

DOMINION PHYSICAL LABORATORY

It was discovered in preliminary investigations at the Dominion Physical Laboratory that mould had a much greater tendency to develop in a humid atmosphere on surfaces that had been papered by the ordinary trade method than on unpapered surfaces. (Further work along this line was taken up by the Plant Diseases Division.) However, the problem of reducing the tendency for moisture to condense on the inner-wall surface still remains to be investigated, and work on this is still proceeding.

AUCKLAND PANEL

The main research project undertaken under the direction of the Auckland Building Research Panel during the year was an investigation of the behaviour under stress of a floor consisting of pre-cast reinforced-concrete joists and slabs. This was undertaken at the request of the Housing Construction Department. The objects of the investigation were—

- (1) To determine whether joists and slabs could be cast by a manufacturer which would support the design and assembly loads in accordance with accepted principles of reinforced-concrete design and whether they could be submitted to the handling of carriers and workmen in the course of erection without structural damage;
- (2) To determine whether a floor could be built up of pre-cast units consisting of slabs and joists which would develop T beam action in accordance with accepted mathematical theory of reinforced-concrete design, and whether the extent of T beam action developed would provide a suitable factor of safety;
- (3) To find any faults in construction or assembly of the system as a whole;
- (4) To determine the factor of safety and load factor for such a system when subjected to the New Zealand Code domestic load of 40 lb. per square foot of floor area.

The conclusions from the first series of tests were as follows:—

- (1) The units adopted will stand all reasonable handling by workmen, carriers, &c., and also withstand the assembly stresses;
- (2) T beam action is definitely developed, but whether complete up to point of failure of steel it was not possible to say;
- (3) There are no apparent faults in system, although some minor improvements are possible;
- (4) The assembled floor showed a factor of safety of 3.9 for the New Zealand Code domestic loading, but the steel was only stressed by computation to 53,000 lb. per square inch and by extensometer to 43,650 lb. per square inch, so that if a mild steel of 29 tons per square inch were used the factor of safety would be 4.8 for 4,000 lb. concrete and 3.6 for 3,000 lb. concrete. The floor withstood six times the Code load, and if the steel were stressed to 29 tons per square inch the load factor would be 7.3. A novel hydraulic loading suggested by Professor T. D. J. Leech was used in the experiments and found to be very simple, efficient, and flexible.

The experiments made it apparent that pre-cast units of the type used will carry the design load in a satisfactory manner. It will be necessary, however, for further tests to be carried out before definite recommendations can be made by the Committee. There is also the possibility of construction of this type in a light-weight concrete.

The Auckland panel also made a preliminary report on a plan of work for investigations on light-weight concrete.

DAIRY RESEARCH INSTITUTE (N.Z.)

Dairy Research Management Committee.—Mr. A. Linton (Chairman); Sir T. Rigg; Messrs. T. C. Brash, R. A. Candy, G. A. Duncan, H. E. Johnson, A. J. Murdoch, J. Murray, W. E. Scott, G. M. Valentine, F. R. Callaghan (Secretary); Prof. W. Riddet (Director).

The Committee met at two-monthly intervals throughout the year to review work in progress and consider new projects. Mr. A. Morton retired from the Committee after acting as member since 1927 and Chairman since 1934. Mr. R. A. Candy was appointed by Massey Agricultural College, *vice* Mr. Morton, and Mr. A. Linton, a member of the New Zealand Dairy Board, was elected Chairman.

Research work was again limited to the conduct of projects concerned with New Zealand's war effort.

Dry-butterfat Production.—The staff has continued, as circumstances required, to give advice on and assistance with the commercial production of dry butterfat by the method developed at the Institute. The dry-butterfat plant at Auckland, being run by the Internal Marketing Division, ceased regular operation in June, 1943. With the decision to export whey butter as butter, there has been no call for the plant to operate except for occasional runs to supply small quantities of butterfat for special purposes. Meanwhile, at the request of the United Kingdom Government, a further plant is being established at Frankton as a standby. The Institute has co-operated with the Internal Marketing Division in the designing and installation of the equipment.