

Researches are in progress on mycotic dermatitis. Investigations have also continued on the influence of breeding upon fleece weight, and information is being accumulated which should ultimately throw considerable light upon this matter.

Washing and scouring tests of samples of wool to determine yields of clean wool have been commenced, and the results secured to date show that there is a considerable range of variation between the weight of greasy and of scoured fleeces. The variations are of such a nature as indicate that it is necessary to follow up this work by a closer relation of the fleece weights to the individual animals under observation.

The occurrence of medulated fibres has shown that the result of hereditary influences on the occurrence of this defect are exceedingly variable, but the breeding trials have not been continued for a sufficiently long period to enable the full import of this matter to be accurately assessed.

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.

At the commencement of the year a bulletin was published containing the results of low temperature carbonization experiments on Millerton (Westport) and Blackball coals. These experiments were briefly described in the report for the preceding year. During the year work has been carried out on the utilization of both bituminous and "brown" coals, and the work is summarized under appropriate headings below.

EXAMINATION OF TAR-OILS.

Early in the year an examination of low-temperature tar-oils was commenced upon tar-oil produced in the laboratory from Waikato coal. Shortly after this the Waikato Carbonization Co.'s plant at Rotowaro commenced operations and work was continued on tar-oils produced by this plant. It is considered that a fairly complete examination of the tar-oils is of considerable importance to the industry. Although certain fractions could undoubtedly be disposed of as fuel oil, the return in this way would be small, and other more profitable means of utilization should be investigated. As a fair proportion of the binder used in briquetting the char at Rotowaro is derived from the low-temperature tar-oil methods of increasing the yields of pitch were studied. Blowing the heavy fraction of the tar-oil with air at various temperatures, and with or without catalysts, in many cases gave increased yields of pitch, which, however, were not always suitable as briquette-binders. From the results obtained it would seem to be worth while to carry out further experiments on a larger scale.

Efforts have been made to produce an effective sheep-dip or disinfectant from the lighter fractions of the tar-oils, and, although satisfactory products have been produced, from a chemical standpoint their biological efficiency has not yet been thoroughly tested out. Arrangements have been made for this work to be done elsewhere, as this laboratory is not equipped for such investigations. In the meantime a chemical investigation of the tar-oils is proceeding.

BRIQUETTING.

A large number of briquetting tests have been made with a small laboratory hydraulic press on the efficiency of treated pitches, as mentioned above. This work was extended to the briquetting of Lurgi char, as some difficulty was being experienced in making briquettes which would stand up satisfactorily in the fire under forced-draught conditions. By mixing a proportion of coking coal with the char this could be largely obviated. Alternatively, it was shown in the laboratory that a rapid evolution of volatile matter from the char took place between 700° and 800° C., which would have a tendency to cause the briquettes to open up when heated. A carbonizing temperature of over 700° C. was suggested, and this effected a considerable improvement in the briquettes. At the beginning of December, 1931, the semi-large-scale Yeadon ovoid press was put into operation, and briquetting trials have been made with Westport, Liverpool, Paparoa, Reefton, and blends of bituminous and "brown" coals. The press is capable of treating several tons of coal per day, and it is thus possible to obtain sufficient briquettes for large-scale firing trials. Briquettes made from bituminous slack, such as Westport, proved superior to the screened coal when burned in a domestic grate. This can be attributed to the shape of the briquettes and their regular size preserving a more open fire, in spite of the fact that swelling takes place in a similar manner to that of the raw coal. Swelling can be entirely reduced by blending with a non-coking coal, and blends of bituminous and "brown" coals produced a very satisfactory domestic fuel. Paparoa briquettes are very suitable for domestic purposes, and they have proved especially good under forced-draught conditions. The results so far obtained show that in some cases briquetting on a commercial scale could be recommended. Commercial developments will of necessity, however, be governed by the state of the coal-market, and the difference in costs of screened and small coal.