

of hydrogenation of coal into oil and the unemployment in the mining industry, it appeared necessary to explore the position somewhat more intensively, and accordingly an officer who had carried out most of the chemical work on our New Zealand coals was sent to Britain to study at first hand the newer developments in coal treatment so that at the appropriate time similar activity may be encouraged in New Zealand.

The position was placed before the House in a statement during the 1934 session, and since then the main development has been the increased probability of success of the hydrogenation plant of the I.C.I. at Billingham, although it will probably be not until at least a year hence that the plant will have been running sufficiently long to indicate the modification and improvements which may reduce the high capital cost of such an undertaking so that it may be a safe venture under New Zealand conditions. While in England I discussed these questions at length with the directors of oil companies and with Imperial chemical industries, and also during a visit to the large British Fuel Research Station at Greenwich. The extent and work of the fuel research is very impressive. The capital cost of the plant, &c., was approximately £300,000, and the total staff numbered about 250. The results of laboratory investigations are carried out on a semi-commercial scale. The Station is carrying out a thorough survey of the coal resources of Great Britain, the object being to estimate the amounts of coal in the various fields and their suitability and particular value for various avenues of utilization, including marine, railway, and carbonization and hydrogenation purposes. The staff carries out official tests of various types of plant for the carbonization, &c., also investigations into cleaning of coal, use of pulverized coal, manufacture of metallurgical coke, gas retorts, hydrogenation of tar and creosote, utilization of benzole, &c. It would appear that we in New Zealand may be called upon to discuss seriously the possibility of operations for the production of oil in the near future. In the meantime two things are desirable. First, we should ascertain the probable hydrogenation as well as mining possibilities of various coalfields where there is readily available a reserve of, say, 40,000,000 tons. It should be noted that, roughly, a hydrogenation plant to produce New Zealand's petrol requirements will consume 800,000 tons of coal per year and employ of the order of 1,600 men in mining, and a considerable number of men, say, 800 to 1,000, in the plant and subsidiary operations.

In the second place, it appears desirable to survey a little more closely the possibilities of producing flow oil or natural gas in New Zealand, since production of petrol from flow oil can be carried out at a much less price than from coal, and it is not improbable that the by-products of refining, &c., and allied manufactures might be quite as large a factor in relation to the unemployment position.

In so far as the Department's resources permit, and in conjunction with the Mines Department, inquiries are being pursued in both the above directions. A geophysical survey of part of Taranaki has shown that such methods are definitely applicable to the elucidation of underground structure favourable to oil accumulation, and my conversations overseas confirm that such work is worth while as a preliminary to the more expensive operations of actual exploratory boring. Geological work is also being directed to the general problems in connection with the above problems. It is obvious that very thorough and careful preliminary investigation along all the above lines is desirable before embarking on expenditure such as is called for in developmental schemes.

With regard to production of alcohol as a liquid fuel, a preliminary investigation of the problem has been prepared and published in the Department's journal.

PHORMIUM TENAX.

A step forward is being made in regard to cultivation of flax. During the year, in co-operation with flaxmillers and Massey College, an area of some 60 acres near Foxton has been planted with specially strong and high-yielding varieties so that supplies of pedigree roots may be available for large-scale planting, with all the benefits in improved material and decreased unit cost of production which will arise from such conditions. In addition, at the request of the Unemployment Board