

C. SERPENTINE-SUPERPHOSPHATE.

Further work has been carried out with mixtures of ground serpentine and superphosphate to determine the best conditions for the local preparation of a serpentine-superphosphate. It had previously been determined that the addition of water to the superphosphate greatly accelerated the reaction with the serpentine. The later experiments have shown that the best results are obtained when the moist superphosphate (5 per cent. of water added) is mixed with the dry serpentine.

With the grade of superphosphate employed reaction was practically completed in twelve days. For the usual mixture of three parts of superphosphate with one part of ground serpentine at the expiry of this period the water-soluble P_2O_5 content was 4.8 per cent. and the water-soluble MgO content 2.4 per cent. After a further twelve days the P_2O_5 content was reduced to 4.1 per cent., with practically no change in the soluble magnesia content.

A trial with a ton lot at the works of the Nelson Freezing Co. indicated that it would not be difficult to make a mixture which would resemble in properties serpentine-superphosphate as prepared at superphosphate-works.

MINERAL RESOURCES COMMITTEE.

Personnel.—Dr. E. Marsden (Chairman); Mr. C. H. Benney (Deputy Chairman); Mr. R. L. Andrew; Mr. W. M. C. Denham, M.P.; Mr. W. Donovan; Dr. J. Henderson; Mr. E. O. Macpherson; Mr. F. J. A. Brogan (Secretary).

Mr. W. Donovan, recently retired from the position of Director of the Dominion Laboratory, was appointed to the Committee during the year.

The following is a brief review of the Committee's work. Further details are given in the Geological Survey and Dominion Laboratory sections of this report.

Magnesite.—A geological survey of deposits of magnesite at Takaka was completed and a map prepared. Although veins of pure magnesite occur, the deposit as a whole averages 50 per cent. of magnesite, and removal of the remainder of the constituents, chiefly talc and quartz, would be necessary to provide a grade of magnesite sufficiently pure for such purposes as the manufacture of refractories or metallic magnesium. Inquiries are being made as to possible methods of concentration.

Serpentine.—Further surveys of serpentine deposits in North Auckland were carried out by magnetic methods, and a special report was prepared on serpentine at D'Urville Island, where ample supplies of high-grade serpentine are available. At a later date special contour surveys of serpentine areas and soundings were taken at two localities at D'Urville Island which were selected as alternative sites for the development of the serpentine deposits as a source of supply for the manufacture of serpentine-superphosphate.

Phosphate Deposits.—A geological re-examination of the phosphate deposits at Clarendon was made for the purpose of determining the possibilities of increased production of phosphate to supplement available supplies. As a result of this survey, certain theories regarding the probable extension of the phosphate-bearing horizon were formed, and appropriate steps will be taken to test them.

Sulphur.—A method for the concentration of volcanic sulphur by steam treatment to approximately 99 per cent. purity was worked out at the Dominion Laboratory and shown to be suitable for commercial operation if a serious temporary shortage of imported sulphur-supplies should occur.

Mercury.—The Committee kept in close touch with the development of the mercury deposits at Puhipuhi by private enterprise, actual production of mercury having commenced during the year.

Oil-shale.—Further geological work on oil-shale deposits at the Nevis was carried out. A report on retorting tests with Orepuki shale carried out in Australia indicated that the high sulphur content would add considerably to the costs of producing petrol of normal sulphur content from it. As soon as the necessary drilling equipment can be released from essential work, it is planned to put down the bores at selected points to determine the depth of the Orepuki deposits.

Refractories.—Data were assembled regarding the nature and quantities of refractory materials being used and produced in New Zealand, with a view to determining the possibilities of increasing the use of local products.

Copper.—Copper occurrences at Kawau Island, where some copper was extracted many years ago, were examined by geophysical methods in an endeavour to trace the continuation of certain lodes, and recommendations were made for further prospecting by the Mines Department.

Peat Wax.—A geologist made a special survey of the peat deposits at Chatham Islands which contain a wax of potential industrial value. A considerable number of representative samples collected were found on examination at the Dominion Laboratory to contain an average of about 10 per cent. of wax. The wax, which was examined by the Imperial Institute some years ago, has properties somewhat akin to those of Montan wax extracted from German lignites, which is used for the manufacture of certain classes of polishes, moulded materials, &c. Samples of the wax extracted by benzol have been submitted to the Imperial Institute, London, and to selected commercial firms for report on its industrial possibilities, particularly as a substitute for imported materials now unavailable or in short supply.

Mica.—A geological reconnaissance survey was made of some mica occurrences of promising quality in South Westland, and arrangements are being made for organized prospecting.

Clays, Talc, Diatomite.—Further surveys of industrial clays of various types, talc, and diatomite have been carried out.

WHEAT RESEARCH INSTITUTE.

Advisory Committee.—Dr. H. G. Denham (Chairman), Mr. F. R. Callaghan, Mr. C. S. Sapsford, Mr. R. B. Tennent, Mr. R. K. Ireland, Mr. R. J. Lyon, Mr. J. P. O'Connor, Mr. C. E. Boon, Mr. W. S. N. Rennie, Mr. G. R. Harker, Mr. W. W. Mulholland, Mr. J. Carr, Mr. P. R. Talbot, Mr. W. O. Rennie, Mr. G. Fleetwood. Director: Dr. F. W. Hilgendorf.