

No. 64.

REPORT of Dr. JAMES HECTOR on CHALK found at Oxford, on the property of Messrs. Ingram and White.

2nd March, 1880.

Sample of Chalk forwarded by Mr. Alex. McKay, Geological Department.

THE samples of chalk obtained as above have more perfectly the mineral character and texture of English chalk than any previously discovered in New Zealand. The rock is pure white, fine-grained, and soft enough to be used for the manufacture of crayons. Its composition, as determined by analysis, is as follows:—

Calcic carbonate	...	...	...	...	82.26
Magnesian carbonate	...	...	...	...	1.84
Ferric peroxide	...	...	...	...	Traces
Silicates	...	...	...	...	15.69
Water	...	...	...	...	0.21
Total	...	...	...	...	100.00

Examined with the microscope, this chalk is found to be made up chiefly of minute shells of foraminifera. The chalk from which the samples were taken crops out a quarter of a mile north-east from the north bank of the Eyre River, and eight miles from Oxford, at the upper part of a low bush-clad edge or ridge. The thickness of the stratum is represented by Mr. McKay to exceed 100 feet; but its junction neither with the overlying nor underlying rocks is exposed, so that its thickness may be somewhat greater. It belongs to the Upper Cretaceous period, and is the local representative of the chalk-marl and Amuri limestone in the same formation further to the north. The overlying formation is volcanic, probably Middle Eocene, and the underlying formation is the concretionary greensand. The accessible position of the deposit, and the useful purposes to which it can be applied, render its discovery one of considerable importance to the community. The uses in which it can be profitably employed are as follows:—

1. Manufacture of crayons for use of schools, &c. For this selected samples are admirably suited, the firm, even grain and compact texture of the stone making it superior to most of the chalk imported, and of which there is a large consumption in New Zealand and the Australian Colonies. The only other source from which chalk could be derived to compete with it, so far as yet known, is the group where the natives use a chalk-deposit for carving rude and grotesque images, as lately discovered by Professor Liversedge, F.L.S.

2. As a manure to many kinds of land the chalk would be useful in its natural state, and, owing to its friable nature, could be profitably applied. Burnt into quicklime it would be useful for those soils which require a more energetic form of lime.

3. For the manufacture of whiting, which is a simple process of crushing and washing it into a fine sludge, which is collected in long troughs.

4. For mortar. The quicklime made from this chalk would probably not compete with that made from harder limestones, as it is more difficult to burn thoroughly.

5. Portland cement. This chalk should supply a very notable want in this colony. Cement is very extensively used, and on its good quality must depend to a very large extent the safety of many structures, especially in a colony liable to earthquakes. The imported cement is frequently very inferior, and in important works the sample tests that are made lead to the rejection of a certain percentage of the barrels; and it is obvious that it cannot be properly checked in this manner unless every barrel be examined. The attempts to manufacture cements hitherto from natural cement-stones have failed on account of the want of uniformity of composition; and when hydraulic or other limestones have been used in the attempt to manufacture cement, the extra cost of crushing and twice burning prevents success. The best Portland cement, whether manufactured in England or Germany, is made from chalk similar to the Oxford chalk, mixed with clay in accurate proportions, dried and then burnt almost to vitrification, and then ground to a fine powder. The success depends on the pureness and friability of the chalk and the lowness of cost at which clay can be obtained in the condition suitable for mixing into a pulp with the chalk. The convenience of this chalk-deposit to the railway, and the ease with which it can be quarried, would allow of it being delivered at a low cost; and there is a capital supply of clay to be found on the slopes of the port hills. The Malvern Hills would supply the coal; so that cement-works established about Heathcote would have every advantage in their favour.

JAMES HECTOR.

No. 65.

The CHAIRMAN, Selwyn County Council, to the Chairman of the Local Industries Commission.
SIR,—

Office of the Selwyn County Council, Christchurch, 3rd May, 1880.

Referring to your letter of the 17th ultimo, inviting suggestions for establishing new or promoting existing local industries or manufactures, I have now the honor to inform you that, the subject having been remitted to a committee of this Council for consideration, they desire to recommend to the notice of the Commission the desirability of promoting the manufacture of cement, an article which is very largely consumed, and the material for which exists in large quantities in this country. They would especially draw attention to the recent discovery of chalk in the neighbourhood of Oxford—a substance used in the manufacture of cement. The committee also draw attention to the water-power which might be obtained from several of the rivers in Canterbury, and which might be made available for manufacturing purposes at a comparatively small expense.

I have, &c.,

EDW. V. LEE,

Chairman of the County of Selwyn.