

# Mineralogical Research on Clay and Shale in New Brunswick

Donovan Abbott

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Mineralogical Research on Clay and Shale in New Brunswick\*

DONOVAN ABBOTT

New Brunswick Research and Productivity Council, Fredericton, N.B.

The New Brunswick Research and Productivity Council receives frequent enquiries regarding the possible exploitation of clay and shale in New Brunswick for a ceramic industry. In an attempt to answer some of the questions on the ceramic potential of the available raw materials, the Mineralogical Group of the NBRPC has begun an extensive investigation into the clays and shale of the province.

Most clays in New Brunswick are of glacial or marine origin, many of the clay beds being situated in the valleys of the main rivers such as the St. Croix, St. John and Miramichi. Much of the shale is of Carboniferous age and occurs in the eastern part of the province. Some of these shales are already utilized, as at Minto where an excellent red building brick is produced.

A list of the known clay and shale localities in the province was obtained from the compilation, Record 2, (The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Part A, Industrial). The provincial MINES BRANCH (N.B. DEPARTMENT OF LANDS AND MINES) undertook to obtain the samples. It was not possible to collect from all the listed localities but additional material was obtained from sites not given in Record 2. In all, some 80 samples were collected from 42 localities, most being from sites east of a line joining St. Stephen to Bathurst.

The current investigation is being undertaken by the author and DONALD BARNETT. The first phase is now complete, concerning the quality of the clay or shale rather than the amounts available; it was accomplished using the X-ray diffractometer in the Department of Geology, UNIVERSITY OF NEW BRUNSWICK. X-ray diffraction patterns obtained for each sample gave some idea of the mineral composition, enabling the rejection of unsuitable samples such as those containing much quartz and very little clay mineral or a high proportion of carbonate. Subsequent work, now in progress, is on a detailed identification of the clay minerals, using the newly-installed NBRPC X-ray equipment.

A routine size analysis of each sample was also made. From this it has been possible to establish the percentage of clay mineral present and the ratio between clay, silt and the coarse fraction.

On the basis of the initial X-ray work, the most promising samples, 26 in number, were selected for specific ceramic tests such as firing properties and colour, plasticity, shrinkage, etc. The ceramic section of the Department of Mines and Technical Surveys has done this phase of the work, since the Council does not yet have facilities for such tests. These samples are now being chemically analysed because data on the percentage of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{Fe}$ ,  $\text{MgO}$  and alkalis are necessary to ascertain whether the materials can be utilized. The  $\text{MgO}$  and

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alkali analyses are being done outside, but all the others will be carried out on the new X-ray fluorescence equipment in the Council laboratories.

The final phase of the work will involve differential thermal analysis of some of the samples.

The above mineralogical, chemical and physical data will be combined and correlated to give a basis for assessing the utilization potential of the clays and shales. The results, which are hoped will be reasonably precise, will be published in the latter half of 1966.

It is hoped to develop a ceramic section within the Mineralogical Group, generally intended to be of service to the industry and also promote interest in this field. With this in mind, a program of ceramic researches is being established. The first, following on the present investigation, will be on the blending of local materials either with each other, or with imported clay, so as to obtain a particular ceramic effect. Another long term project will take into account the synthesis of clay minerals.

#### Manganese-Iron Concretions in Nova Scotia Lakes\*

HAROLD L. BEALS

Department of Chemistry, Dalhousie University, Halifax, N.S.

#### Introduction

Research on manganese-iron concretions by the author, under the direction of DR. W.R. TROST of the Department of Chemistry, is being undertaken at DALHOUSIE UNIVERSITY. The concentrically-formed mineral oxides, composed predominantly of manganese and iron, have been found in several eastern Nova Scotian lakes. The concretions lie flat on the lake bottom covered with a thin veneer of silt or may be slightly embedded in the sediment.

Six lakes and one harbour between Halifax and Ship Harbour, Nova Scotia, were investigated for these concretions during the summer of 1965. Firsthand observation of these in their natural environment was made by SCUBA-equipped divers. Lakes Charlotte, Porter and Chezzetcook all contain definite concretions while Pace's Lake and Second Lake show intensive manganese iron precipitation in the areas investigated. Bayer's Lake shows very little black oxide precipitate on lake rocks and no precipitation at all was observed at the mouth of Ship Harbour.

The concretions are dark brownish-grey to black, and are friable when dry. Their size ranges from a few to 25 cm across. Shape is variable, but generally flat or curved; many are biconcave discoidal with a thickened rim (Figure 1).

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