

QUATERNARY COMMODITIES—DIATOMACEOUS EARTH

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ABSTRACT

This report describes previously identified diatomaceous-earth deposits on the Avalon Peninsula. The study was designed to map in detail known occurrences of diatomaceous earth for possible industrial and other uses. Preliminary results from intensive core sampling in bogs and around ponds in selected areas indicate that sufficient quality and quantity may be available for limited commercial use. However, further intensive coring and analysis in the area of interest (planned for February, 1987) is necessary for conclusive results.

INTRODUCTION

Definition and Uses

Diatomaceous earth (diatomite) is a siliceous sedimentary deposit, consisting of the skeletal remains of unicellular aquatic plants called diatoms (Plate 1). The diatoms are divided into numerous species that thrive in either fresh, brackish or marine environments; however, there are certain species that are common to all three habitats. Most of the diatom species are free-floating organisms. After death the skeletal remains settle to the bottom of the pond, and over the years, if the environment is favorable, accumulate to form a diatomite deposit. Diatomite is used primarily as a filter aid, although it is commonly used as an extender in paint, paper, rubber and plastics. Abrasives (e.g., toothpaste), anticaking agents, heat-insulating materials and pesticides also commonly contain diatomite.

During the 1986 field season, an evaluation of known occurrences of diatomite in selected areas of the Avalon Peninsula (Figure 1) was undertaken. This assessment was aimed at determining the quality and quantity of diatomite for possible industrial use. The field program was divided into a summer and winter component.

Beaver Pond, Bryant's Cove, Perry's Cove, Mussel Bed Pond, Heart's Desire and Hant's Harbour were chosen because of their reported potential for having large quantities of diatomaceous earth (Fletcher, 1965). Other areas were also checked for diatomite, including Western Bay, Northern Bay and the Southern Shore area.

Summer Program

The summer field program consisted of field sampling on bogs and pond margins. Field sampling consisted of core sampling with a peat auger at intervals of 30 to 50 m, depending on the size of the bog or pond. Core samples were described, detailing the type of deposit (peat, diatomaceous earth), thickness of deposit (in metres) and any impurities (organics, silt-sand) that may be present. Where thickness

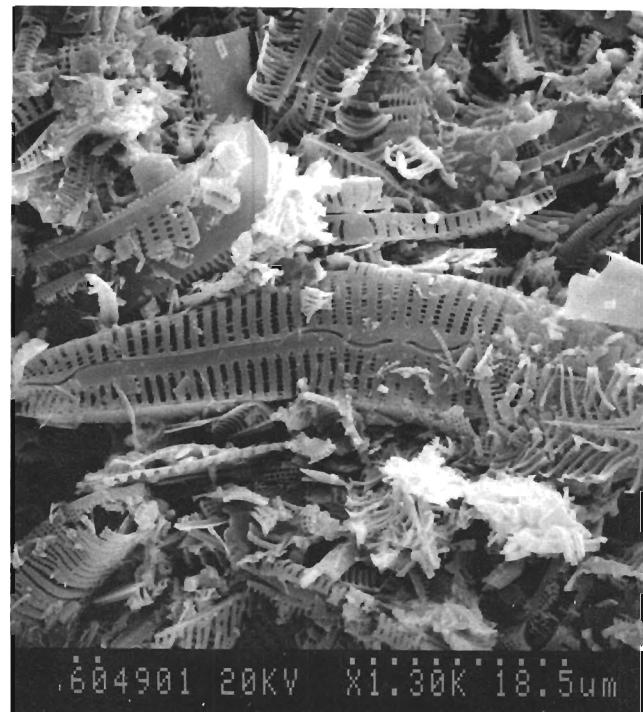


Plate 1: *Cymbella*, a typical diatom (X1300) from the Avalon Peninsula.

of material warranted, more than one sample was obtained.

Winter Program

A winter field program will be carried out on ponds selected from this summer's work, to verify the quantity of diatomite in these areas. The program will entail reconnaissance core sampling through the ice. Based upon the occurrences of diatomite, a sampling program will be conducted along grids of potential diatomite deposits.

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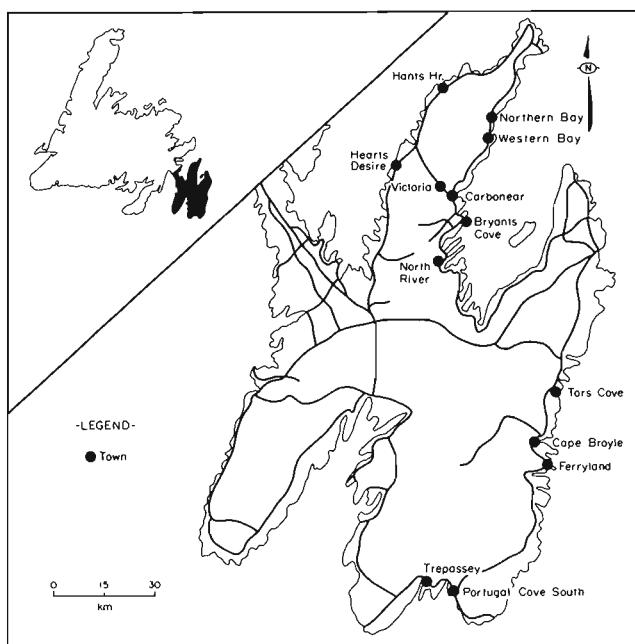


Figure 1: Location of study area.

RESULTS OF SUMMER SAMPLING PROGRAM

Beaver Pond

Beaver Pond is located in the community of Victoria (Figure 1). The pond is approximately 800 m long and 300 m wide, and is accessible by gravel road. A total of 44 holes were drilled and 37 samples taken. Thirty-two cores were taken from the bog located at the west end of the pond and 12 cores from the pond margin.

The depth of core penetration ranged from 0.5 m to 4 m, and diatomite thickness ranges from 0.1 m to 3.4 m, with an average of 1.2 m. A typical core sample from the area contains alternating layers of peat and diatomite, with each layer ranging in thickness from 0.2 m to 0.5 m. Where diatomite thicknesses are greater than 0.7 m, alternating layers of silt-sand and diatomite are common. The silt-sand layers range in thickness from 0.4 cm to 0.8 cm.

The color of the diatomite changes from a whiteish brown for samples with a high organic content, to a bluish gray for samples with a high silt-sand content. However, both types of diatomite are a pale white when dry.

Bryant's Cove

Bryant's Cove is situated 3 km southeast of Harbour Grace. Two ponds were visited in the area and a total of 65 sites were cored; only 6 contain diatomite. Due to rocky shorelines and deep water, all samples were taken from bogs surrounding the ponds.

The depth of core penetration ranged from 0.75 m to 3 m, and diatomite thickness ranges from 0.01 m to 2.4 m, with

an average of 1.2 m. All samples of diatomite recovered contain a high percentage of organics (greater than 30 percent), commonly as alternating layers of peat between layers of diatomite.

Perry's Cove Pond

Perry's Cove Pond is located in Perry's Cove 14 km northeast of Carbonear. A total of 16 sites were cored around the pond of which 11 were from the adjacent bog and 5 from the pond margin. Five of the 16 sites contain diatomite; three from the pond and two from the bog.

The depth of core penetration ranged from 0.3 m to 0.75 m. Diatomite thickness ranges from 0.1 m to 0.4 m, with an average of 0.46 m. The diatomite is layered in association with organic material.

Mussel Bed Pond

Mussel Bed Pond is located 1 km northwest of the community of North River. A total of 52 sites were cored, 37 from the adjacent bog and 21 from the pond margin. Mussel Bed Pond has a rocky shoreline, and diatomite was only encountered in 5 drillholes in the southwest corner of the pond.

The depth of core penetration ranged from 0.1 m to 0.5 m. The diatomite thickness ranges from 0.1 m to 0.5 m with an average of 0.18 m. Unlike the previous areas, diatomite occurs as a discreet unit instead of alternating layers of peat and diatomite.

Heart's Desire

Heart's Desire is situated on the east side of Trinity Bay. The pond and bog in the community are adjacent to Highway 80, which passes through the town. A total of 18 sites were cored and 15 samples taken, all from the bog.

The depth of core penetration ranged from 1 m to 2.5 m. Diatomite ranges in thickness from 0.3 m to 1.5 m, with an average of 1 m. All core samples containing diatomite show dispersed organic material, as with the Mussel Bed Pond site. No alternating layers of either peat-diatomite or silt-sand were observed.

Hant's Harbour

Hant's Harbour is located approximately 30 km northeast of Heart's Desire. The area of interest is a river that flows through the community. A total of 13 sites were cored, 3 from the river bank and 10 from the bog surrounding the river mouth. Seven of the 13 cores contain diatomite.

The depth of core penetration ranged from 0.3 m to 2.75 m. Diatomite ranges in thickness from 0.3 m to 2.1 m, with an average of 1.3 m. On the river bank and in the bog pond no overlying peat is present. In the bog surrounding the pond, 1 m or more of peat overlies the diatomite. Organic material is dispersed throughout all diatomite samples.

Other Areas

Other areas from which diatomite was previously reported include Western Bay, Northern Bay, Trepassey, Portugal Cove South, Cape Broyle and Ferryland (Figure 1). Although numerous cores were taken in these areas, no diatomite of any significance (greater than 0.1 m) was encountered.

At Tors Cove, a previously unknown diatomite deposit was located in the vicinity of a pond and bog situated 3 km south of Tors Cove, adjacent to the Southern Shore highway. A total of 13 sites were cored and 13 samples taken, all from the bog around the pond.

Depth of core penetration ranged from 1 to 3.5 m. Diatomite thickness ranges from 0.7 m to 3 m, with an average thickness of 1.9 m of fairly pure diatomite. Little or no organics were observed in the cores recovered.

SUMMARY

A total of 300 cores were drilled and 100 samples obtained. Data analyses of grain size, chemistry and taxometry are on-going, and preliminary results are expected

to be available in early 1987. No large economic quantities of diatomite were found in the field areas to date. Significant amounts (20 to 40 percent) of organics were noted in approximately 40 percent of the samples. The remaining 60 percent of samples contains up to 20 percent organics. All samples were taken from bogs or from sites near shore.

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Note: Mineral Development Division file numbers are included in square brackets.