Deposits of diatomaceous earth (diatomite) are fairly common in swamps all over Gabriola Island, but they are particularly abundant in the watersheds of Hoggan Lake and Descanso Bay.

There are deposits in wetland east of Hoggan Lake [A] at the top of Brickyard Hill, and in the Commons Land and Good Earth Market Garden [B], which is an ancient lake bed and likely at one time part of Hoggan Lake, now only connected by Goodhue Creek running south of South Road.

Diatomaceous earth was once extracted commercially from the swamp [C] and there are similar deposits in other wetlands in this watercourse such as at [D]. There's also some in the Descanso Valley on the *left* side of this photograph.

The fossil diatoms are freshwater species, and the deposits are post-glacial (Holocene).

Diatoms, diatomite, and diatomaceous earth

It is not often we come across a topic for *SHALE* that has biological, historical, and geological aspects to it. But diatomaceous earth is one, and it has generated three articles by three different authors for this issue.

While the quarrying on Gabriola of sandstone for building stone and millstones, and the quarrying of shale for making bricks, are well known, the quarrying of diatomaceous earth on Gabriola is so little known that, on first hearing about it, the reaction of many people is, "what is it?"

Diatomaceous earth, or *diatomite* as it is also called, resembles chalk except that it is made of silica rather than calcium carbonate, and it is very much lighter in weight and far more porous. It occurs in greyish-white bands, usually thin, but sometimes a foot or more thick, in clay- or peat-rich soil. It is the skeletal remains of particular types of microscopic algae that live in ponds and marshes.

These algae are called "diatoms". They form slimy brown coatings that look like mud on submerged plants and rocks. Their cell walls contain silica, and when they die, they sink to the bottom to create a siliceous ooze that eventually becomes diatomite.

In the old days, and maybe occasionally still today, diatomite was used for toothpaste; cleaning silverware, fingernails, and suede shoes; dressing cuts and wounds; giving a flat finish to paint and varnish; ridding gardens of slugs and other pests (it absorbs lipids from the waxy outer layer of insects' exoskeletons, causing them to dehydrate); as a cosmetic; making light-weight bricks (the ancient Greeks made bricks of it that could float); as a parting medium in steel foundries; adulterating cheap chocolate creams and flour; and constructing thermal barriers for gunpowder stores aboard wooden ships.

Diatomite is used today, among many other applications, as a filtering agent, filler, adsorbent, grit-free abrasive, and insulator.

Diatoms are not the only living things using silica. Fossil microscopic *radiolaria* are sometimes found as "chert", another form of silica, which occurs in the conglomerate of the Geoffrey Formation on Gabriola.

Horsetails contain silica. The siliceous deposits in the epidermal cells of these plants once made them useful for scouring pots and pans, and polishing wood.

Samples of diatomite from Gabriola contain large numbers of microscopic round structures, possibly of silica. Although not confirmed, these may be *stomatocysts*, the resting stage of algae other than diatoms. Two stomatocyst-forming genera—*Dinobryon* and *Synura*—live in Epplers Swamp.

Siliceous spicules of freshwater sponges have also been observed in the diatomite.

The processing of diatomaceous earth involves crushing, air-drying, calcining, and grading. Air-drying on Gabriola was done by spreading out the freshly quarried material in the sun on one of the sandstone plains that are common on Gabriola.

Calcining is baking the earth in a kiln that is hot enough to drive off moisture and burn off organic matter, but not hot enough to fuse or melt it. Descriptions of early-20th century treatment plants often mention the use of rotary kilns to break up the material and produce a controllable temperature.

Grading the fine dust was usually done with a cyclone or series of cyclones. Separation within the cyclone was achieved in a high-speed rotating airflow established within a cylindrical or conical container. Larger (denser) particles in the rotating stream had too much inertia to follow the tight curve of the stream and struck the outside wall, and hence fell into the funnel at the bottom of the cyclone where they could be removed.

Unfortunately, nothing of the old plant on Gabriola has survived beyond a few cement foundations, scattered bricks, and bits of broken glass. As you'll see as you read on, documents, photographs, and memories have faded away almost as completely.

The advertisement on the previous page, by the way, was not paid for, but is included for its purely "educational" interest. The use of diatomaceous earth in the cosmetics industry is, it seems, alive and well. Don't worry; there has been no change in *SHALE* policy regarding commercials. ◊

An old diatomite mine at Vivian, Nevada. It operated in 1919–22. The large cone is a cyclone used to separate the fine diatomite dust from coarser grit.

Dan Turner